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ABSTRACT

This book contains eight papers on a study of the effects of academic career magnetic education on high schools and their graduates. "Introduction" (Robert L. Crain) explains the study's objectives and methodology, which included an analysis of data files on 9,176 students who applied to 59 different academic career magnet education and interviews with 110 applicants to 4 different all-magnet high schools, 30 respondents to a survey of high school students, and 14 career magnet graduates. The titles of the remaining papers, which explore possible reasons why some career magnet programs promote academic achievement whereas others interfere with academics, are as follows: "Career Magnet Graduation Rates" (Robert L. Crain, Robert Thaler); "The Academic Effects of Career Magnets" (Robert Thaler, Robert L. Crain); "The Design of Career Magnet Programs and Students' Experience of High School" (Debora Sullivan, Judith Warren Little); "Career Magnet Schools: Effects on Student Behavior and Perceived Parental Support: Part One" (Gail L. Zellman, Denise D. Quigley); "Career Magnet Schools: Effects on Student Behavior and Perceived Parental Support: Part Two" (Robert L. Crain); "Placing the School-to-Work Transition in the Context of Adolescent Development" (Anna Allen); and "Conclusions" (Robert L. Crain). The book contains a total of 80 references and 32 tables/figures. Appended are additional notes on the study methodology and a discussion of using the experimental results to estimate the impact of career magnets on students. (MN)

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National Center for Research in Vocational Education

University of California, Berkeley

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Anna Allen
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Executive Summary

This study has identified a group of career magnet high school programs that have had some success in educating low and moderate income minority and immigrant students. The study has also identified ways in which these programs have not succeeded. The programs used an academic curriculum accompanied by coursework (and sometimes internships) to prepare students for specific careers. These career magnet programs—located either in regular comprehensive high schools or combined with other magnet programs to fill up an entire building—usually have the same budget as the regular comprehensive schools.

The programs we studied are in a large area that includes a low-income city and a ring of older suburbs. Six out of every seven students are African American or Hispanic; the remainder are white, Asian, or Native American. Many of our conclusions are based on a comparison of a large number of students who had been randomly assigned through a lottery admission process to career magnet programs and to comprehensive schools.

This study shows important positive and negative effects: While graduates of the career magnets are more likely to succeed in work and college, the career magnets also have a high dropout rate.

Two kinds of studies were done:

1. *A student records analysis, using data files on 9,176 students who applied to 59 different programs*

   We compared test performance, absenteeism, and graduation and dropout rates of lottery winners to those of lottery losers. We also compared the 59 programs to each other to identify attributes of the more successful ones.

   Based on this analysis:

   - Many career magnet programs have lower graduation rates and higher dropout rates than do comprehensive schools. The low graduation rate seems to be caused by programs setting high standards for their students and, in many cases, pushing weaker students out of the most desirable classes and internships. One of the problems with career magnet programs is the ease with which they escape accountability. These programs used the lottery to admit only half of their students; they handpicked the other half of their enrollment. Consequently, overall school performance can look good even while students have a lower chance of graduating than they would have had if they had lost the lottery.

- Compared to the comprehensive high schools, students in academic career magnet programs do not have higher or lower reading scores, do not take advanced graduation tests more or less often, and do not have higher or lower absenteeism. In fact, the career magnet students have slightly lower math scores.

- Career magnets that give students more time on computers raise student math scores.

2. *Surveys and interviews*

A survey of graduates used two-hour interviews with 110 applicants to four different all-magnet high schools, comparing lottery winners who graduated from the career magnets to those who lost the lottery and graduated from a comprehensive high school. In addition, we conducted four-hour interviews with 30 of the respondents in the survey, covering their life from childhood to the present to understand the role of the high school in their development. We also conducted a substudy of the high school experiences of 14 of the career magnet graduates.

Based on these analyses:

- Graduates of the career magnets earn at least a third more college credits and are more likely to have chosen a college major in their first one or two years after graduation.

- Career magnet graduates report that they engage in less high-risk behaviors: They report that they smoke less, have fewer fights, drink alcohol much less often, and become pregnant or cause pregnancy less often.

- Career magnets have an indirect effect on their families: Graduates say their parents volunteered help for college twice as often as parents of comprehensive graduates.

- The success of career magnet graduates seems to hinge on the schools' ability to help students through the process of adolescent identity development. The career magnet students were more likely to have developed a career identity and to report that their high school education enabled them to become "really good at something."

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CHAPTER 1

Introduction

Robert L. Crain

The United States high school is trapped in a dilemma. It must now teach all students because it is now widely assumed that every student should graduate from high school. Those who do not are called "dropouts," a term invented in the 1960s when not finishing high school became a failure to achieve the new norm. Furthermore, over 60% of high school graduates are enrolling in college immediately after high school. Now that high schools are no longer serving only the academically talented students, or at least the ones capable of obtaining the "gentleman's C" easily, the high school must find some way to motivate and teach students who are less well-prepared academically so that they will both want to and be able to graduate. But the high school is now chasing a moving target, as academic standards are being pushed upwards by political pressures of various kinds. Finally, there is pressure to increase equality of educational opportunity, and pressure from low-income parents who are convinced that their children must attend college if they are to survive economically in the modern world—which means that their children will not be going to vocational schools.

This is a study of a group of high schools and programs within high schools in which students choose an academic career focus in eighth grade and leave their neighborhood for a regional career magnet school (or a regional program located in a distant comprehensive high school building). The careers the students choose usually require at least a community college education. The study suggests that however unlikely the notion of creating a school that is both career oriented and college oriented might seem, this is probably the type of school wanted both by the nation's leaders and by parents and students as well. Careers (if they can be made to work) may prove to be an ideal strategy for urban high schools. On the one hand, an academic career focus makes good sense for students who are unsure they will be able to graduate from college and have little access to occupational information either at home or in their community that will help them find quality employment. On the other hand, most of these students are not willing to trade the chance to attend college for even a good entry-level job. A high school that promises both college and a career allows them to make a choice without foreclosing their options.

There is good evidence here that giving the college-preparatory high school an academic career focus creates a meaningful high school curriculum and provides a great deal of support to adolescents in this period

of their development. Adolescent support is very important, and is an area where the traditional high school curriculum fails badly.

These academic career magnets did not arise from some central planning process. They were the result of a gradual evolution. The district, with many poor and minority students, many immigrants, and much white flight, had many schools in crisis. In several cases, high schools were deemed to be such failures that they were closed and reopened with a new student body and staff. Other schools were closed because of declining enrollments due to demographic change or a loss of interest in vocational programs. Frequently, the school was located in an area where there were not enough students to support a school, and the school had to become a magnet. But vocational schools were not very popular, and there were already enough high school programs serving gifted students. By a mixture of default and foresight, local design teams of community residents, political leaders, and educators, who were given considerable power in the decisionmaking process, arrived at the idea of creating career magnet schools that were college preparatory without being restricted to the most highly talented students, attracting their students by having a particular focus—almost always a career. This academic career magnet strategy—we call it "career magnet" for short—became a successful recruiting device, and as the schools became popular and garnered more than their share of the city's best students, the principals of the comprehensive high schools fought back, creating their own "programs-within-a-school" in their high schools. By the late 1980s, a third of all the area's students were being educated in these schools and programs.

In this area, the academically oriented career magnet may have been as much a bottom-up innovation as one imposed from the top down. The model has proven its political acceptability, its ability to garner support from parents and students, and its ability to be mass produced. The opportunity to evaluate program outcomes, to see if the model prepares a more skilled labor force, creates a more college-ready pool of high school graduates, or lowers the dropout rate, grew out of a happy accident: These schools, searching for the fairest possible way to admit students while being pressured to provide equality of educational opportunity, chose to fill one-half of those seats by creating a lottery system that made it easy for students to apply to the academic career magnet schools.

The Programs and Our Studies

Career magnets recruit students by offering to prepare them for college and simultaneously provide them with an introduction to a particular career. In business, a program may teach accounting, financial management, word processing, and other business skills on the assumption that students will attend college, furthering their business education there. A typical program

operates as a school-within-a-school, providing a number of classes separate from the rest of the school, typically teaching ten to twelve classes over a four-year period that are specifically focused on a career. Many have instructors with experience in that career. They take students on field trips to firms, and operate extracurricular clubs to learn more about careers. About half of them bring in lecturers from industry, use businesspeople as one-on-one mentors, or hold workshops on how to prepare a résumé. At the same time, they provide students the opportunity for a college preparatory education, and attempt to send a large number of students to community college. For many students, especially inner-city minority students, adult success may seem unattainable without college. They may live in a section of the city where few adults hold good jobs, and the only good jobs they know are held by people with college degrees. Attending a traditional vocational education program that focuses on employment rather than college would seem to be giving up too much, even for those who appear to have little chance of succeeding in college.

The career magnet programs seem firmly committed to college preparation. For example, one career magnet program arranged its senior year schedule so that all students in the program spend one afternoon a week at a nearby college taking a course that will count toward their high school diploma and later as college credit. The program director describes this college course as popular with students, adding that it makes clear that career preparation is not incompatible with attending college.

This report will focus on several research studies:

- We used the *school records data*, the official records of 9,176 students who attended 59 career magnet programs, comparing the programs to each other to identify strategies that were especially effective or particularly problematic.
- We used a *survey*, a 2½ hour interview with 110 high school graduates who had either attended career magnet programs in four school buildings or were members of a control group who had applied to the same programs but were randomly rejected and graduated from a comprehensive school.
- We analyzed *life history data*, four additional hours of interviews conducted over two days with 30 of the 110 graduates in the survey.

The Sites

The 59 programs are located in 31 different high schools. Eight of the high schools are devoted entirely to career magnet programs, while the remaining 23 are comprehensive high schools that have a career magnet program within the school. For the survey of graduates and the life history interviews, we chose students who had applied to programs in four schools

that were completely dedicated to academic career magnet programs, comparing lottery winners who had attended and graduated from the career magnets to students who had applied to the same four schools but had lost the lottery and had attended and graduated from comprehensive high school programs. We chose the four career magnet schools because they seemed to represent fully developed models. All four schools were at least ten years old and they collectively covered a wide range of career interests. We will refer to them as the "Health Careers magnet," the "Business magnet," the "Business Communications magnet," and the "Engineering magnet." In all cases, we were studying buildings that were entirely devoted to career magnet programs, even though the career magnet school within a comprehensive school is the more common model. We did so because we thought that the dedicated career magnet school building provided a clearer example that would be easier to interpret than the mixed model; we also thought that the school building devoted entirely to career magnet programs would be more typical of what other school districts in the United States would choose to implement. In each of the programs, we selected pairs of students who were matched on ethnicity, sex, achievement test scores, and neighborhood. One student in each pair had entered the lottery, attended the career magnet program, and graduated; the other lost the lottery, did not attend the career magnet program, and graduated from a comprehensive high school. Since we are not studying the students who dropped out, we are using a model that allows us to detect whatever differences occur when the two types of schools succeed in graduating a student.

The Schools

"Health Careers" is a career magnet with only two programs: A small program, medical science, which focuses on theoretical medicine, seems primarily intended for college-bound students who are likely to enter nursing or pre-med programs in four-year colleges. The rest of the school is used by a large health careers program that includes eight different components, each preparing students for qualification in a particular area: practical nursing, nursing assistants, dental assistants, dental laboratory work, medical laboratory work, medical accounting, medical office work, and medical secretarial work. The wide variety of options within the program allows the school to serve students who vary greatly in their ability to work in front-line hospital service. Those who cannot tolerate blood or who cannot function safely in a clinical setting are provided a variety of office alternatives. At the same time, the academically strongest nursing students may move into the medical science program.

The "Business magnet" high school contains seven business-oriented programs. The most prestigious is its program in securities and finance, but equally important are programs in accounting, business, computer

science, business law, marketing, and secretarial science, an information systems program, which prepares students to work in a variety of word-processing positions. The presence of seven related programs gives the school the opportunity to reduce its dropout rate by moving students among the programs if they lose interest or are unable to do the work in one area.

The "Business Communications magnet" is in many ways a similar school, but because it lacks the high-prestige finance program, it probably does not attract as many students interested in attending Ivy League colleges. Its three programs are (1) computer programming/accounting, (2) marketing, and (3) secretarial studies and word processing careers. Its advanced accounting students can do coursework at a partner college.

The "Engineering magnet" has four programs. Two of its programs are in aerospace technology and computer science. In contrast, its other two programs, one in law and the other in television and other communications, provide a liberal arts complement. The student body is economically heterogeneous but entirely African American. Two of the programs have partnerships with local colleges: (1) The aerospace technology program is designed for students going on to engineering school and provides considerable work in engineering design. A small coterie of students are provided the opportunity to learn to fly. The program also offers opportunities to learn about the operation of electronic equipment and the maintenance of airport facilities; and (2) the communications program's main focus is to provide students with the opportunity to operate a television production facility in the school. However, it does not have good connections to the local television industry since its students and graduates must compete against college graduates even for unpaid internships. The other two programs do not have college partnerships in place. Computer science, which is primarily mathematical in its orientation, provides more computer theory than practice. The law is a popular subject with high school students. The program has a variety of internships, and it holds a mock trial competition each year. As with many of the programs, the academic career focus is broad, including preparation for police work and other aspects of law enforcement as well as preparation for college pre-law programs.

All the career magnet schools must cope with the extremely wide range of students that they have, and most do so by moving students between programs. Sometimes a single program will be stratified, with a small group of students in the most advanced courses and others in an easier curriculum.

Most career magnets receive no additional funds from the school board (a few have federal or foundation grants) and must reallocate funds within their regular budget to pay for any special equipment the programs require. The only exception are "redesign" funds, which become available to a school after it is deemed to be such a failure that it is closed and reopened with a new name and a new staff. These schools receive a supplemental

appropriation for the first five years of their new life. Some total academic career magnet schools began their life as "redesigned" schools, making them the only academic career magnet programs that received extra funding.

These career magnets provide a good opportunity to isolate particular elements of school-to-work programs, since some of the programs emphasize computers more than others, stress more visits to firms, or use more teachers with backgrounds in industry. The district's management system for these academic career magnets is highly decentralized. As a result, each program is free to create its own particular theme and to decide for itself many of the details of its curriculum and structure.

While our study is of schools that are focused by their definition, the fact that the focus is specifically career-oriented limits the extent to which this study can be considered an evaluation of schools with focus. Nevertheless, it will contribute to our understanding of those schools as well as to the discussion of strategies for school-to-work transition. Its data will also be useful to the policymakers concerned with "school to work" and especially with "school to work for the college bound" (Bailey & Merritt, 1997) and "academies" (Kemple & Rock, 1996; Stern, Raby, & Dayton, 1992). This study also contributes to the research on choice, since these schools were constructed as choice schools—being magnets first, with the choice of theme coming second. Indeed, some of the programs created in this effort have no academic career focus at all.

Finally, these programs in some ways resemble charter schools. Although they do not have charters and are not officially deregulated, all the high schools in this area are surprisingly autonomous. Decisions about what kind of program to operate, what changes in program should be made, and what new programs should be added are made with very little control from any school board or higher government administration. Nowhere in local or state government is there any educational administrator specifically responsible for career magnet programs, and, indeed, the official descriptions of the schools in this area do not even recognize the career magnets as a distinct type of high school program. Further, records do not identify whether students are in a particular program but only the building that they are in, so that a student in a career magnet program in a comprehensive high school is not identifiable as such statistically. This means that these schools are quite free to do as they wish, with little opportunity for the school system to regulate them through controls or even evaluate them. The schools are bound by the standard regulations governing personnel, which sometimes cause serious problems when schools need to recruit faculty who have specialization in their particular careers. But the looseness of these high schools, carried almost to an extreme, may mean that these schools provide interesting lessons for persons concerned with how charter schools may work out.

The Selection Process

When the district's first academic career magnets were designed, it was intended that they be like most magnet schools in America—selective. However, the school board and administration has probably been more sensitive to issues of race and class segregation than most school districts in the country. When critics made the school board aware of the conflict between the magnet school's goal of being selective and the social goal of furthering racial and economic integration, a compromise strategy was gradually worked out that noticeably reduced the segregative nature of the selection process. First, in what appears to have been an effort to encourage students to apply to magnet programs, every middle school student in the area was required to fill out an application for high school (even if they planned only to attend their neighborhood high school), using a form that made applying to a magnet school as easy as possible. Secondly, each academic career magnet program could admit only one-sixth of its students from those with above-grade-level reading scores in the city's student body and another one-sixth from those reading below grade level (the other two-thirds coming from those within one standard deviation of the area mean). Finally, they required that half of the students in each of those three reading groups be admitted by lottery. That was a political compromise, since the principals of the career magnet high schools wanted to select all their students and the critics wanted them all randomly assigned; 50% was an obvious compromise point.

If students wished to be considered for career magnet programs, they listed up to eight in order of priority. If they were also interested in programs at the four most highly selective schools in the area, they checked a separate set of boxes on the questionnaire; this arrangement meant they did not risk wasting their first priority choice by betting on a long shot. Finally, if they wanted to attend their neighborhood comprehensive high school, they could simply check a box on their application. The application process was spread over the entire fall semester of the eighth grade, giving students a chance to change their minds and to discuss choices with their parents.

In late January, a subcontractor selected enough students to fill half the seats in each career magnet program. They did so by assigning random numbers to each student's choices, but preceded each random number with a number that represented that student's priority of choice. Thus, each student's first choice began with the number one, their second choice with the number two, and so on. The students with the lowest random numbers choosing each program were automatically offered admission. A waiting list was also created to replace decliners. Separate lotteries were performed for students with high, average, and low reading test scores. High was defined as one standard deviation above the mean, low was defined as one standard deviation or more below the mean or having no test data. Of the

students randomly selected for each program, 16% were from the high- and another 16% from the low-reading groups, with the remaining 68% from the average reading group. Students whose test scores fell in the top 2% of the test distribution were exempt from the lottery and given their first choice assignment whenever possible.

The files of students who had not been selected by lottery, including those who had been wait listed for the program, were then sent to the school, which selected enough students to fill one-half of the seats in the entering class from the remaining students. Students admitted to a program on the basis of their test scores being in the top 2% were counted as part of the top 16% of those selected by the school.

The studies reported on here are based on a cohort of 9,174 students who applied to 59 different academic career magnet programs. (Students are also admitted into these programs in the tenth grade if they attend a seventh- through ninth-grade junior high, but we did not study these students.) Of these students, 2,373, or 26%, were admitted by lottery to their first choice academic career magnet program; of these, 63% entered ninth grade in that program. Of those who lost the lottery, 18% were school-selected and attended their first choice academic career magnet program. The remaining lottery losers were either admitted to one of the elite public high schools, a career magnet program that was not their first choice, entered ninth grade in their neighborhood comprehensive high school, or withdrew from the public school system (see Table 1.1).

Table 1.1. Destinations of Students Who Applied to Academic Career Magnet High School as Their First Choice

	Lottery Outcome	
	Win	*Lose*
Attended First Choice Program	63%	18%
Attended Elite High School	2%	3%
Attended Another NYC High School	29%	72%
Other, No Record	6%	7%
Total	100%	100%
(n)	(2,373)	(6,801)

Of the students applying to these programs, 61% were female and 39% male. This imbalance may be because this sample of career magnets often focuses on careers in health and business, which are attractive career areas for females. It may also be that females are more future-oriented at age 14, or that boys want to attend their neighborhood high school while girls want to escape from their neighborhood at that age.

Student ethnicity is coded by the school board into five categories. For the cohort reported on here, the ethnic breakdown is as follows: 47% African American, 27% Hispanic, 8% white, 5% Asian American, and ½% Native American. Information concerning ethnicity is voluntary, and 986 students (12.5%) were not ethnically classified.

We used the school district's method of assigning students by lottery to career magnet schools as the basis for our study. It is not immediately obvious that the lottery admission used in the school district was indeed a randomized experiment, and, in fact, it differs in certain ways from a traditional experimental design. But it does meet the two necessary conditions: (1) that subjects be randomly assigned to different treatments and (2) that outcome measures be taken after they have received the treatment. Lottery assignment to oversubscribed programs meets the first condition because it guarantees that some students will be randomly admitted to a particular program while other students who also applied to that program are randomly rejected. In all of our research we were studying only students who were lottery admitted to career magnet schools and graduated from them, comparing them to lottery-losing applicants to the same schools who had graduated from comprehensive high schools.

We refer to the study as an experiment-based study rather than a classical laboratory experiment because we could not include every student who participated in the lottery. We could not study the effects of the programs on the students who left the study, attending private school or leaving the school district after having participated in the lottery. We could not study the postgraduate performance of students who did not graduate from the schools. In addition, when we did use the lottery as an experiment, we had to allow for the fact that some students were "misassigned," some lottery losing students attended the career magnet program despite having lost the lottery, and some lottery winners chose to attend comprehensive high schools. These omissions mean that our study should be thought of as *based on* an experimental model but not a perfect experiment. We have been as rigorous as possible in retaining the power of the original random assignment. Since in its initial step the lottery is exactly the same as the first step of a randomized experiment, we have stayed as close as possible to that original population.

We examined the data for the first two years of the lottery (students admitted in 1987 and 1988), and students entering the fourth year in Fall 1990. The 1987 data showed deviation from randomness: lottery winners and lottery losers differed in their middle school performance to a significant degree. These differences were small but with an overall sample size of over 47,000, small differences are nevertheless statistically significant. The 1988 lottery selection showed a much smaller bias, although still statistically significant, and the 1990 lottery process shows no statistically different results at all. We spent the first year and to some extent the second year debugging the system until nonrandomness was eliminated. In our study, we used the data for the 1988 entering class of ninth graders.

For each of the three reading groups and for every program (there were 136 programs in 1988) we identified the number of lottery winners and lottery losers and counted the number of students who actually entered

the program after being admitted randomly. Since the lottery selection used the lowest random numbers, every student who applied to a particular program as his or her first choice had priority over students who applied to that same program as their second or higher choice. We then eliminated every program with fewer than nine students admitted to the program randomly and fewer than nine rejected or placed on the waiting list. We also eliminated programs where fewer than 60% of those randomly admitted actually attended the school, and those where more than 40% of the lottery rejected were selected by the school for admission after being rejected by the lottery. We thought the data from these programs would be meaningless because of so many assignment errors. In a few cases, we found that the entire set of first priority students were admitted because there were fewer students choosing the school as their first priority than there were seats available for lottery admission; in these cases, we looked to the students who had selected the school as their second priority choice to see if an experiment could be constructed using only the second priority choice students. We assumed that students who selected a school as their first priority are different from those who select a school as their second priority, so that simply comparing all lottery winners to all lottery losers would bias our sample, with the lottery winners being more likely to be first choice and the lottery losers to be later choices. For this reason, we made all our experiments within a single priority choice.

When the selection of all experiments was completed we found that we had identified 112 experiments in 59 different programs involving 9,174 students. Some of the 59 programs were so large that we had valid experiments for all three reading levels, but more often a program provided valid data for experiments at only one or two reading levels.

The first studies that we conducted were analyses of the effects of being randomly admitted to a career magnet program on the academic performance of students—their official school records of test scores, absenteeism, graduation, and dropping out. We also identified those characteristics of career magnet programs that had the largest impact on the students—either by increasing or decreasing the performance of the career magnet students compared to the lottery losers who had applied to the same program. For example, we found that when students applied to a program that provided students with more opportunities for hands-on computer work, lottery winners had higher math test scores than lottery losers, implying that the computer time was the factor that improved students' scores. We also used this sample to study graduation rates.

Methodology for the Survey and Life History Studies

In the studies reported here, we turn from the general academic data on students to personal interview data. We conducted a set of interviews with

a subsample of 110 graduates of career magnets and regular comprehensive high schools. In addition, 13 matched pairs of this subsample were asked back to give us life histories and to let us observe them as they worked together on a team work project.

We concentrated on four schools, each made up entirely of career magnet programs. We did this because we expected schools entirely dedicated to career magnet programs would have more administrative support because they did not have to compete with a large comprehensive program, and, thus, would be able to focus on making their programs effective. We wanted to compare students who were admitted by lottery to the four schools, and who had subsequently graduated from them, to students who had lost the lottery, attended a comprehensive high school, and had graduated from there.

We drew a random sample of the lottery winners and losers and deleted everyone who had not graduated from the high school within five years. To make the two groups as similar as possible, we selected graduates matched on the program they applied to, their home neighborhood, their test scores, ethnicity, and gender.

Locating prospective interview respondents and gaining their cooperation was complicated by regulations covering issues of confidentiality, which required that the school district obtain each student's permission before releasing the student's name and address. However, the Board of Education's research office was too overworked to accept a subcontract from us to do this. As a result, we employed a guidance counselor from each school to make the initial contact and obtain permission for us to follow-up with potential respondents. This turned out to be a difficult process and by the time school ended for the academic year, only one-third of the prospective respondents had agreed. We had originally selected 483 graduates, but wound up interviewing only 110. This does not represent a low response rate (nearly everyone with whom we made contact agreed to the interview, for which they were well paid), but a low rate of success in contacting them initially. There were a number of reasons for this, the most common being that the school address for a student was wrong or because the guidance counselor was unable to make the repeated attempts that would have been necessary to contact them.

Of the 110 graduates in this subsample, fifty-one had "won" the lottery and attended, and graduated from, their first choice career magnet. The other fifty-nine had "lost" the lottery and graduated from a comprehensive high school. All were between the ages of 19-22 years (mean age was 19.8) at the time they were interviewed. Respondents in this subsample identified themselves as follows: 46% African Americans, 3% Asian Americans, 37% Caribbean Americans, 12% Latino Americans, and 4% multiethnic. (Because there are few whites in the district schools and we thought they would be

quite different from minorities in their school and post-high school experiences, we decided to select only minorities.)

The Survey

The interview combined the qualitative richness of open-ended questions with the quantitative analysis possibilities of closed-ended questions. This format was chosen because we wanted standardized data, but discovered from our initial pilot interviews that much of the data we were seeking was too complex or threatening to gather in a closed-ended manner. The instrument was designed to capture differences in how graduates experienced their high school classes, peers, teachers, counselors, and the school as a whole; their employment history; career development; ethnic identity; and lifestyle choices such as alcohol consumption, drug use, and contraceptive precautions. Following the interview, respondents completed internal locus of control and Rosenberg's (1965) self-esteem instruments. This interview ranged from one-and-a-half to two-and-a-half hours in length. All interviews were tape-recorded for later assessment.

Four African-American graduate students (3 female and 1 male) interviewed the respondents over a nine-month period after being trained in listening and interview techniques. Anna Allen interviewed the three Asian-American respondents and the one white respondent who fell into the sample by accident (her ethnicity had not been known when she was sampled). Most of the interviews were done by an interviewer of the same sex. Respondents were paid, including a bonus for travel time.

All interviews were tape-recorded. In general, respondents were encouraged to talk as much as possible, and no effort was made to limit the length of these interviews. Over 95% of the questions were open-ended, and responses were recorded verbatim. Post-interview coding led to some questions having as many as 50 response categories.

The instruments took the respondent through the years from eighth grade to the present, asking their recollection of why they chose their high school program, what their attitudes about college were at that time, what their work experience and career goals had been, what their socio-emotional strengths and problems had been, and the amount of support they received from their school staff. For the high school period, they were asked about their peer groups, the kinds of friends they had, the amount of support they got from the work that they did, and the connection of that work to school. A large number of questions dealt with the connections between school and work and the degree to which classes integrated school and work. There were also questions about community service.

Students evaluated the amount of support they received from teachers, and evaluated themselves in terms of their greatest accomplishments and difficulties, their level of confidence, and any problems they had in school.

They were asked whether they were under peer pressure to perform poorly in school, how much counseling they received from staff about college and career, and what advice they received from significant others in their family and social group about life choices. They were asked their opinion of the teachers they had and why they did or did not like them.

They were asked why they had chosen the career that they had in mind; whether the high school gave them opportunities to have a mentor, to job-shadow, or to hear speakers about work; and generally how they felt about the amount of information that was available to help them make career decisions. They were asked to describe their present job—its strengths, weaknesses, and general characteristics; how many times they had changed jobs and why; what their future job aspirations were; and their evaluation of their work skills—their strengths and weaknesses and their performance compared to fellow workers. They were asked to describe the skills needed for their particular job, so that their responses could be related to SCANS criteria.

Next, they were asked about their college plans in high school, and whether their parents were willing to provide financial support. In terms of college, they were asked what their grades were, the amount of homework they did, what difficulties or problems they had, and what their strengths and weaknesses as a college student were.

In the last section, they were asked a number of personal questions about what they like to do; their sense of happiness; their sexual behavior, use of contraception, and whether they had conceived a child; their alcohol and drug use; and their history of fights, arrests, and victimization. They were also asked about their family structure, their parents, older and younger siblings, the amount of contact they presently have with their parents, the amount of stress in the family, feelings they had about the work their parents and siblings did; the family's problems, activities, and the role of punishment and violence; and the family's experience with welfare. They were asked about their marital status, their use of child care if they had children, their religious behavior and the support they received from their religious organization, and their political views and racial attitudes.

In general, questions probed much more toward the affective side of their opinions—questions like "What do you love to do?" were asked as well as "What do you like to do?" A number of questions gave them an opportunity to talk about emotional problems and about support from various others, as well as lack of support. Given the context set up by the instrument, we are optimistic that their answers about fighting; their arrest records; their victimization; and their use of cigarettes, alcohol, and drugs are reported more accurately than in most surveys.

There was no significant difference in the ethnic make-up of the comparison groups in the survey and life history interviews (although there are more students in the control group whose families do not use English

at home). The original experimental plan was to create pairs matched on ethnicity, gender, same choice of career magnet program, eighth grade reading scores, and the junior high school they came from. This procedure provided us with too few possible pairs, so the junior high school of origin criteria was broadened to include other junior high schools in the same general neighborhood. In the final sample, lottery winners and lottery losers were similar in most important respects. Demographic analysis reveals no significant differences by sex, ethnicity, eighth grade reading scores, or parental education, but one test (seventh grade math) does favor the career magnet graduates. Measures of reported socioeconomic status (SES) show no appreciable difference between the two groups. All had entered high school in the Fall of 1988 and all had graduated by 1993. None had been in special education.

Table 1.2 shows no significant bias between the two groups, but does show that both groups are heavily female. This is partly because our sample of good experiments included more females than males, and partly because these four career magnets emphasize careers that tend to attract female students. However, the fact that the sample is two-thirds female does not bias the comparisons of lottery winners to lottery losers since females are overrepresented in both groups.

After interviewing them, we discovered that 11 of the 59 lottery losers had been admitted to career magnet programs within their comprehensive high schools. Table 1.2 shows a significant bias. Graduates from the comprehensive programs had lower seventh grade math standardized test scores than did the lottery winners.

Table 1.2. Characteristics of Career Magnet and Comprehensive High School Graduates

	Magnets	*Comprehensive*	*Significant?*
Under Age 20	29%	36%	No
Female	61%	70%	No
African American	49%	41%	No
Caribbean American	35%	37%	No
English at Home?	82%	66%	$p < .06$
Moved at Least Once	67%	62%	No
Mean Reading Score, 7th Grade	53	53	No
Mean Math Score, 7th Grade	57	53	$p < .05$
Grades, 7th Grade	77	76	No
Days Absent*	2.07	2.13	No

*Mean of the natural log of days absent in the year

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Life History Interviews with 26 Graduates

From the 110 graduates who participated in the two-hour "short" interview, we selected a subsample of matched pairs for a semistructured life history interview. We were able to successfully interview only 13 matched pairs; six others who were possible matches cited various reasons for not participating. There are no discernible differences between those not re-interviewed and those who were re-interviewed. This subsample of 26 graduates was composed of five pairs of males and eight pairs of females; four non-matching respondents were also interviewed, bringing the sample to 30.

The life history/career development interviews were approximately four hours long and, when possible, conducted over two different days. The first two hours were devoted to a life history and the second two to tracing career development and the respondent's activity after high school. The interview guide began with general background information about the respondent and his or her family prior to entering school. It included specific questions about the family and educational experiences for each chronological year of school from kindergarten until the time of the interview. This procedure provides a complex description of how school and home interacted for each respondent to affect their career development and what meaning each graduate retrospectively attaches to these experiences. Asking each respondent specific questions about each year allowed us to look for patterns across cases.

Each interview typically produced a transcript of slightly over one hundred pages. Transcripts were coded using an ethnographic program, "Atlas/ti," recommended to us by Matthew Miles. Judging from the number of stories of childhood trauma and descriptions of misbehavior, this interviewing procedure seemed successful in getting candid histories.

Whenever possible the interviewers who had interviewed the respondent for the semistructured interview did the life history interview in order to take advantage of the rapport established during the first interview. Each case was coded and analyzed by the graduate student who did the interview. Cases and strategies were discussed in frequent meetings with the authors.

Since the 30 respondents provided both the interview and the life history, it was possible to mix the quantitative analysis of the interviews with the ethnographic analysis of the life histories.

Bias

While this is not a perfect randomized experiment, it comes much closer than traditional longitudinal studies. Students had been randomly assigned to one of two groups, either winner or loser, through the administration of

a lottery. They had chosen the same programs; were in the same reading ability groups; and, in the case of the survey, shared the same talent and tenacity necessary to graduate from a high school. We think the most important attribute of this study is that it evaluates schools that are in the real world, to which students were assigned randomly. The schools are not pilots or experiments; they have been mass-produced and have passed the test of feasibility. The use of lottery admission gave us the opportunity to base our analyses on an initial random assignment of students. While we could not achieve the rigor of a laboratory experiment such as might be done in medicine, we think the experiment-based statistical analysis here, using the lottery admission to these high school programs, provides us a much stronger analysis than has been done before.

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CHAPTER 2

Career Magnet Graduation Rates

Robert L. Crain and Robert Thaler

Many career magnet programs have lower graduation rates than the comprehensive schools. Only 26% of the lottery winners graduated at the end of the fourth year, while 31% of the lottery losers graduated after four years. This is not because lottery winners are more likely to transfer out of the school district; 16% of lottery winners and 17% of lottery losers leave the school system. The difference is in dropouts. At the end of the third year of high school, 7% of the lottery winners had dropped out of school, compared to 6% of the lottery losers. After the fourth year of high school, 14% of the lottery winners had dropped out, and only 11% of the lottery losers had dropped out. We do not have data on the ultimate difference in dropout rates, since 44% of lottery winners and 41% of lottery losers were still in school without having earned enough credits for graduation at the end of the four years.

Because lottery outcome is not synonymous with magnet/nonmagnet placement, the results are understated (see Appendix B). We conclude that comprehensive schools are graduating four students for every three that career magnets graduate. The career magnets' lower graduation rate and higher dropout rate are statistically significant and of considerable policy significance. Since our research reveals that the lottery winners were not academically inferior to the lottery losers, the lower graduation rate cannot be explained by a difference in academic ability.

Looking for an Answer: Why the High Dropout/Low Graduation Rates?

There are good reasons to be surprised by this finding because there are seemingly obvious reasons why career magnets should be *more* successful at holding students and graduating them than comprehensive schools. Therefore, we need to look at possible reasons why the opposite could be true.

The Disadvantages of the Career Magnets

A conflict between missions: preparing students for careers and holding students in school.

Schools have the responsibility of getting as many students as possible to graduate, since lacking a high school diploma is seen as disastrous today. For many schools, this means providing considerable academic counseling

support. The job of getting students through high school is made more difficult by the seeming remoteness of college and the lingering doubts for many students that they will actually get there. The integration of academics and career training is a strategy for making high school seem worthwhile, but it presents significant problems. To seriously prepare a student for a good entry-level position, one which promises real opportunity, requires a great deal of academic preparation and work experience. Based upon the standards of the current job market, however, it would be better for most students if they also had at least some college education before embarking on a career, and students know that; the vast majority of the district's students would very much like a college degree. To prepare students for a four-year college also requires a great deal of work; enough to occupy most of a high school curriculum in itself.

A fundamental problem with career magnets is the conflict between offering students the best education while providing employers with qualified workers. On the one hand, students need to be educated with a curriculum that moves at their pace and at the appropriate level of difficulty; however, on the other hand, employers need workers who are sufficiently qualified to meet their needs. A student might be able to make satisfactory progress in a high school program, yet might not be able to meet the standards of the workplace where they expect to be employed after graduation. The school is forced to set higher standards to satisfy the demands of its commitment to prepare students for employment than it would if it were providing an education merely sufficient for graduation and admission to a local community college or university.

Nowhere is the conflict more dramatic than in the area of health. Traditionally, the district's vocational high schools had prepared students for the practical nurse license. However, over time, the number of hours of practice required and the amount needed to be learned made it virtually impossible for students to pass the LPN examination by the end of high school. One solution, which is now widely used, is to replace the LPN license with the Nursing Assistant Certificate, a much more elementary certificate primarily used to qualify people to provide bedside care in nursing homes. The requirements for a Nursing Assistant Certificate can be met in high school, by on-the-job training, or by training done by the hospital workers union. Use of the Nursing Assistance Certificate is one way high schools can provide students with a "success opportunity"—a test they can pass. It qualifies students for low-level work in a hospital setting, and may be viewed as a first step in preparing a student for community college work on an LPN or RN license. Up until the last few years, hospitals had been uninterested in high schools providing nursing assistant training; instead, they wanted schools to develop rigorous academic programs for students who could become college trained RNs. At that time, there was a considerable shortage of RNs, and hospitals would have liked high schools

to increase the number of students entering the college nursing pipeline. Many educators were opposed to this, however, believing that they would simply be creating another program where many students would fail.

Dropping requirements down to the Nursing Assistant Certificate level, however, does not solve all of the problems. Programs must be sure that their students will be "safe" workers in a hospital setting. Because every career magnet that attempts to place interns or graduates is preparing students for a demanding job, the problem of sorting students never goes away.

In areas where there are no credentials, the problem is even worse. How well-prepared must a secretary, a computer programmer, or an apprentice accountant be to not embarrass the school? There is no clear answer, but the relative payoffs to the school are clear: An annoyed employer can harm the program by not taking interns in the future or by criticizing the school among his or her colleagues, while a student who does not get an internship will not result in any loss to the school. In that situation, a rational decisionmaker will use caution and raise the bar higher to make sure that every student who is presented to the employer is a credit to the school.

Traditionally, high schools served only the last three grades of high school, and vocational programs tended to use the first year as an "introduction to occupations" year in which students were not in a particular program. They entered a program in their junior year and received a two-year preparation. This is a common strategy still: for example, the Academies of Travel and Tourism, which operate in a number of high schools in the nation, are two-year programs and admit their students at the beginning of the junior year.

This traditional structuring of high school was made more complicated for academic career magnets in three ways. First, moving ninth grade into high school meant creating a two-year pre-career sequence of courses before students began internships and most of their career training. The second complication arises from the fact that students are required to commit themselves to an occupation before entering ninth grade and then wait two years to test their choice with real experience. The third complication is that it often takes more than two years to complete enough high school credits to enter junior-year status. The result is that students are in a holding pattern for two or three years after having chosen a career. These complications may explain the high dropout and low graduation rates of academic career magnet programs.

What Kind of Students Are More Likely To Drop Out of Career Magnets?

There is no easy way to answer this question. Even students in the process of dropping out are not always able to evaluate which of the various

pressures was the most substantial. Our best information on this subject comes from asking, "What are the characteristics of dropouts that distinguish them from students that stay in school?" These characteristics differ slightly between career magnet programs and regular comprehensive schools, and in an unexpected way. Table 2.1 shows the eighth-grade factors that predict the graduation rate for lottery winners and lottery losers. The first two factors—eighth-grade absenteeism and middle-school grades—can be thought of as motivational. They reflect a lack of interest or a lack of motivation. The last two—their middle-school reading and math scores—measure cognitive ability.

The hypothesis is straightforward: The comprehensive high school teaches academics and evaluates students on their academic performance; therefore, it should be difficult for a student with low academic aptitude, here measured by middle-school test scores, to graduate. In contrast, the career magnet school is preparing students for both school and work and requires multiple modes of intelligence. Students need to have good work habits, character, and commitment. The student with weaker scores but a stronger work ethic should be more likely to graduate from a career magnet than from a comprehensive high school. Table 2.1 shows exactly the opposite effect.

The career magnet, which should be more concerned with multiple modes of intelligence, instead requires higher cognitive scores for graduation.

Table 2.1. Predicting Graduation for Students Who Applied to Career Magnet by Lottery Outcome: Average Achievement Students

	Lottery Outcomes (Standardized Regression Coefficients)	
8th-Grade Predictors	*Win*	*Lose*
Absenteeism	08	07
Grades	23	26
Reading Test	05	05
Math Test	13	08
Multiple R	36	36
(n)	(1,549)	(4,131)

This evidence shows that both poor motivation and poor scores predict failure to graduate from high school, but for the career magnet programs the effects of test scores are slightly more important. This data supports our conclusion drawn from visiting the schools that the career magnet schools are academically more demanding than the comprehensive schools. This is surprising. We would expect the dual-focused academic career magnet to utilize the students' multiple modes of intelligence, since it teaches multiple lessons; instead, it is requiring more traditionally measured cognitive ability than the comprehensive school, which is expected to evaluate students solely on academic performance.

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There is an important irony here. The present high rate of unemployment among urban youth means that the student who graduates from a comprehensive high school and does not go on to college has poor employment opportunities. The student with a high school diploma from a career magnet school may have an entry-level position available—in word processing, for example. If the career magnet bestowed a high school diploma on a student with weak cognitive ability but good work habits and word processing skills, it would help the student gain employment as an alternative to college. Yet the career magnet is setting cognitively higher standards for graduation than the comprehensive high school. Higher cognitive standards for graduation lead to a lower graduation rate for students with weak test scores.

Using the Lottery Experiments To Identify Traits of Programs with High and Low Graduation Rates

We pursued the problem of why career magnets have lower graduation rates by looking at the graduation rates of different career magnet programs to see if programs with low graduation rates have particular characteristics. One of the few requirements placed on these programs by the board of education, and the most important for research purposes, is that these programs are required to offer half their seats to students on the basis of one of three lotteries conducted separately for students with high, average, and low reading scores. In our study, we were thereby able to create evaluations, based on the lottery as a randomized experiment and the responses to a telephone survey of school administrators, to measure outcomes of 18 programs serving students with high reading scores, 35 programs serving average students, and 39 programs serving students with low reading scores—all programs where we had data from the program administrators (some administrators refused to be interviewed). Since many programs had enough applicants at the various reading levels to permit us to create an experimental design for more than one reading group, these 92 experiments are located in only 49 programs.

Through our analysis, we will attempt to explain the graduation rates for students of these 49 programs. For pretest data, we have seventh- and eighth-grade reading and math examination scores, grades, and attendance data for each student. Students apply to high school at the end of eighth grade, so that seventh- and eighth-grade scores predate the students' choices of high school and predate their lottery assignments.

Our main source of independent variables is a telephone survey of program administrators in which we asked whether their particular program had various elements in its school-to-work curriculum. In this report, we will use their answers on four topics:

1. Amount of job placement for graduates
2. Emphasis placed on careers rather than college
3. Amount of career counseling
4. Extent of assignment of student projects

Analysis

Since each reading level is a separate experiment, our analysis must be done separately for each. We focused our analysis mostly on the average group, which represents not only two-thirds of the district's students, but also the performance of typical low and moderate income minority students. We analyzed the data in two ways.

Step A: The correlations, computed at the program level, between the extent of each career program component and the "program effect," and the performance of applicants to the program who were lottery winners compared to the performance of lottery losers among the applicants—both adjusted for seventh- and eighth-grade academic performance—were evaluated. This is the "perfect" experimental result in that it is unbiased. Being unbiased, it includes students who were randomly selected into the "experiment" and "control" groups but did not actually experience the "experiment" or "control" treatments. As already discussed, some lottery winners (29% for whom we have students outcome data) did not attend their first choice academic career magnet program, and some of the lottery losers (18.3%) received the experimental treatment because they were able to attend the academic career magnet because they were selected by the program (see Appendix B).

Step B: Next, we computed mean test scores from the individual data file, comparing individuals who won and lost the lottery, but separating those winners who did not go to the program and also those losers who did go. These tables are no longer an unbiased experiment, but they provide a test to validate the significant program-level correlations done in Step A, and they give us our best estimate of the magnitude of the effect.

Procedure for Step A: We compared the ability of the programs to graduate their students by computing for each program the graduation rate of the students who applied to the program and won the lottery to the graduation rates of the applicants to the program who lost the lottery. We took several steps to make the most accurate comparison between different programs. First, we compared the graduation rate for all the students who won the lottery, whether they actually entered the program or not, to the graduation rate for all the lottery losers, including even those who were picked by the program—this meant we preserved the randomness of the lottery, getting an unbiased measure of the "graduation power" of each program in comparison to the other programs the students might attend, and thus a good measure of the difference in graduation power between

the different academic career magnet programs. (This technique does underestimate the differences among the programs, as shown in Appendix 2; however, it eliminates any bias caused by discarding well-qualified lottery losers getting into some of the schools and perhaps some highly qualified lottery winners choosing not to enter some schools because they were invited to attend a more prestigious school, for example.) Because the students are sorted into separate lotteries depending on test scores, we might have (if the number of applicants is large enough) two or three separate measures of the "graduation power" of each program. We found in some programs that students with high test scores who won the lottery were more likely to graduate than were high-scoring applicants who lost the lottery, but applicants with low test scores did not increase their chances of graduation by winning the lottery. For other programs, we found the opposite: The high scoring students did not increase their graduation chances by winning the lottery, while the students with low scores did.

Second, we adjusted (using multiple regression) for any difference between lottery winners and lottery losers in seventh- and eighth-grade test scores, absenteeism, and grades. Since the lottery is random, differences should be small; however, the slight benefit of removing random error in the lottery drawing is worth computing the regression equation.

Third, we correlated characteristics of the programs with our measures of their "graduation power," doing separate correlations for each of the three reading levels, since these are separate lotteries. Since the proper statistical significance test should use the number of programs (49) as the degrees of freedom, not the number of students (7,987), we correlated the "graduation power" of each program with the various measures of the program's management, resources, and practices. (Since these programs vary in size, we weighted the data for each program based on the number of winning and losing students using a formula suggested to Armor (1972) by Frederick Mosteller for aggregate data.) The apparent effect of each program was measured by computing a graduation rate or dropout rate, adjusted by regression for seventh- and eighth-grade standardized reading and math scores, grades, and absences. The mean for all students who applied to each program as their first choice and lost the lottery was subtracted from the mean for all first choice winners to the same programs.

Results

At the aggregate program level, we found a negative correlation (-.565, $p = .001$) between graduation rates and the amount of job placement. This is a comparison of all lottery winners and lottery losers who had applied to each program. This is the proper comparison to test for significance but far too conservative to estimate the actual magnitude of the program effects. Table 2.2 shows an estimate of the effect of the higher graduate job placement

rate on graduation rates of students in the average reading group based on the individual data file. In Table 2.2 and the following tables in this chapter, this is our best estimate of the effect of the extent of career placement.

Table 2.2. Graduation Rate (Regular) by Extent of Career Placement: Average Achievement Students

	Lottery Outcome		
Extent of Career Placement	*Win*	*Lose*	*Difference*
High	34%	42%	-8%
(n)	(483)	(2,014)	
Low	38%	43%	-5%
(n)	(1,051)	(2,548)	

Note: Significance test: Program level data, $t = -5.65$, $p = .001$, $n = 34$

The figure in the lower right-hand corner, 43%, is the graduation rate for students who had applied to a program that did not have a strong placement component and who were not admitted by lottery. In the lower left-hand corner, 38% is the graduation rate for students who had applied to the same career magnets, won the lottery for admission, and attended the career magnet school. The difference of 5% implies that students who won the lottery were less likely than those who lost the lottery to graduate from high school within five years.

The figure in the upper right-hand corner, 42%, is the graduation rate of students who applied to programs with a high placement rate but who lost the lottery and were not school selected. Finally, the number in the upper left-hand corner, 34%, represents the graduation rate of students who applied to these same high-placement-rate programs, won the lottery for admission, and entered the program.[1]

The students who applied to the career magnets with high placement rates and lose the lottery have the same graduation rate as lottery losers who applied to the career magnets with low placement rates. This is a surprise. One might have expected the students who were interested in high school programs with high placement rates to be less interested in college and less interested in education generally; they would then have a higher propensity to drop out from a regular comprehensive high school. The catalogue that middle-school students use to choose programs usually does not describe post-high school employment opportunities, so it may

[1] The percentages in the table are not literally results from a randomized experiment, since they are a simple summing of all students who applied to all low-placement or high-placement career magnets. The percentages are not adjusted for the number of lottery winners and lottery losers in each of the separate programs; however, the results are quite close to the adjusted differences used in the unbiased aggregate program level correlations to test for significance.

be hard for students to choose on that basis. More likely, nearly every middle-school student plans on going to college, so whether the school offers employment after high school is irrelevant to them.

Regardless of whether the program one applies to places more or fewer graduates, students are more likely to graduate if they do not win the lottery for admission and do not attend a career magnet program. They are also more likely to graduate if they begin high school in a comprehensive school. In addition, the fact that the difference between lottery winners and lottery losers is greatest in the first line suggests that the graduation rate from career magnet schools is especially low in those programs with a high placement rate. This pattern is confirmed by the program-level analysis: The .565 program-level correlation presented in Table 2.2 is not biased and is statistically significant.[2]

Other findings are also consistent with Table 2.2. For example, programs that place many of their graduates in employment have a higher ninth-grade dropout rate for average reading-group students (program level $r = .39$, $p < .02$).

Circumstantial evidence suggests possible reasons why schools that emphasize finding employment for its graduates may have fewer graduates. Table 2.3 shows that all career magnets, but especially those with high placement rates, have greater ninth-grade absenteeism. The effect of winning the lottery and attending a career magnet program with low levels of placement is to increase one's first year absences from an average of 12.6 to 14.3, a gain of 1.7 days; however, for those who use the lottery to get into programs with high placement rates, the difference is an increase from 14.4 to 17.6, a gain of 3.2 days. (To minimize error introduced by long tails in the absenteeism distribution, in this and the following tables, the means shown are, in fact, the antilog of the mean of the natural log of the number of days absent.)

Table 2.3. Number of Days Absent in First Year of High School, by Extent of Career Placement: Average Achievement Students

	Lottery Outcome		
Extent of Career Placement	*Win*	*Lose*	*Difference*
High	17.6	14.4	3.2
(n)	(423)	(1,702)	
Low	14.3	12.6	1.7
(n)	(902)	(2,128)	

Note: Significance test: Program-level data, $r = .133$, $p = .448$, $n = 35$

[2] Program-level data also gave the true number of degrees of freedom, 35 (the number of programs), and not 6,096 (the number of cases in Table 2.2).

Table 2.4. Number of Days Absent in Second Year of High School, by Extent of Career Placement: Average Achievement Students

Extent of Career Placement	Lottery Outcome: Win	Lose	Difference
High	11.0	8.8	2.2
(n)	(385)	(1,606)	
Low	8.9	7.7	1.2
(n)	(816)	(1,980)	

Note: Significance test: Program level data, r = .609, p = .000, n = 35

Table 2.5. Number of Days Absent in Third Year of High School, by Extent of Career Placement: Average Achievement Students

Extent of Career Placement	Lottery Outcome: Win	Lose	Difference
High	18.2	16.9	1.3
(n)	(288)	(1,354)	
Low	15.2	13.7	1.5
(n)	(672)	(1,354)	

Note: Significance test: Program level data, r = .195, p = .262, n = 35

Table 2.6. Number of Days Absent in Fourth Year of High School, by Extent of Career Placement: Average Achievement Students

Extent of Career Placement	Lottery Outcome: Win	Lose	Difference
High	16.3	15.6	0.7
(n)	(238)	(1,085)	
Low	13.9	13.3	0.6
(n)	(555)	(1,397)	

Note: Significance test: Program level data, r = .182, p = .303, n = 34

Although this table shows a large difference in days absent, the program-level correlation is not significant. We do get statistical significance when we use a related variable, however. Program heads were asked, "Some schools focus on college preparation, some focus on college preparation geared toward particular careers, and some focus on career preparation. Which one of these best describes your program: college preparatory, college preparatory with an emphasis on a career in . . ., or career preparatory?" They were then asked, "Does your program prepare students to work if they choose to upon graduation?" Finally, the program head was asked, "In addition to the high school diploma, does your program offer any special certification, license or diploma that is not offered to the rest of the school?"

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Only 10% said that they were college preparatory and did not provide students any preparation for work; another 10% said that they were purely career preparatory, not preparing students for college. Eighty percent of the programs said that they did both college and career preparation; four-fifths said they prepared students for work, and four out of seven said they offered a special certificate connected to career training. When we correlated the amount of program emphasis upon career and the number of days absent in the first year of high school, we found that those that emphasized career placement had significantly higher absenteeism ($r = .33$, $p = .05$).

The second-year data also show high-placement programs having higher absenteeism. Table 2.4 shows a high absenteeism rate during this second year of school for students who win the lottery to attend high-placement programs, and the program-level correlation, .609, is highly significant. These results are not the result of any bias in the lottery. Lottery winners to programs emphasizing placement actually have significantly lower absenteeism in the eighth grade ($r = -.382$, significant at $p = .03$) than do lottery losers who selected the same programs, so the high absenteeism presented in Table 2.4 occurs despite having to adjust for an eighth-grade self-selection bias towards low absenteeism.

The number of credits earned towards graduation is also quite low in both years (program-level correlation with placement is -.70 in the third year and -.58 in the fourth, both significant at $p < .001$). The combined effect of the high dropout rate and the inability of students to pass enough courses results in a large number of students who are unable to graduate at the end of four or five years.

After visiting many programs, we concluded that programs emphasizing employment after high school had two problems. First, they had to set higher standards for their students, which made graduation difficult and school alienating. Secondly, they postponed career education until the third year, partly to wait for students to mature and partly to give the program time to screen out students who seemed least able to do the work for which they were to be trained.

Setting High Standards

It may seem peculiar to claim that entry-level employment demands more skill than attending college, but that does reflect the nature of the demands being put on career magnet programs. A program is not held responsible for a weak student being rejected by a college; the school transcript will no doubt show low grades, and the college will simply conclude that this is one of the school's weaker graduates. However, every graduate sent for an interview is a reflection on the school. An employer who hires an unsatisfactory worker, or just interviews one, may not be interested in future applicants from that school. (Employers usually do not see high school transcripts of applicants.)

Why do students in career magnet programs with high placement have high absenteeism, fewer credits earned, and a lower graduation rate? We can only speculate because we have no direct data from a large enough sample of tenth-grade classrooms, but it is possible that by tenth grade, students are both bored and frustrated—bored by the relatively small amount of career content in their classes and frustrated by the high level of difficulty of those classes. Such difficult courses are likely to be used by school staff to identify those students who are most likely to be suitably qualified for internships, career-related jobs, and the advanced classes to prepare them for employment.

It is also possible that third and fourth year students are not earning credits because the demands of career classes are too great (since the school staff is concerned that its students are well-qualified for employment) or because students are overloaded with the combination of internships, part-time work, and their schoolwork.

Table 2.7. Percentage of Below-Average Achievement Students Remaining in Same School Building Through Third Year of High School, by Degree of Program Emphasis on Job Placement after Graduation

	Lottery Outcome		
Program Emphasis	*Win (& Attend)*	*Lose (& Don't Attend)*	*Difference*
Employment	78%	62%	-16%
(n)	(48)	(82)	
College	83%	86%	+3%
(n)	(66)	(268)	

Note: Percentages are adjusted to remove effects of 8th grade background differences. Significance test: Program (aggregate level) data. $r = -.34$, $p = .05$, $n = 34$

Table 2.7 shows that lottery winners in programs with a strong emphasis on placing graduates are 5% more likely to transfer to another school by the end of their third year of high school than are lottery winners in programs with a low level of emphasis on job placement or no placement facilities at all. In the fourth year, the transfer rate is 5% higher ($r = -.54$, $p = .001$, table not shown).

Setting Quotas for the Program's Junior Year

The need to select students who, in the eyes of the program staff, can meet the demands of a program's junior- and senior-year career preparation often results in dropping all but a small proportion of students from the program. One business program we visited ranked all its second-year students, whether admitted by lottery or school selection, and kept the thirty highest ranked students of the ninety who had entered the program in ninth grade. The rest became regular students of the comprehensive high school. We should not exaggerate the harm done; the students have not

been relegated to a dustbin bottom track because the comprehensive high school in which that program is housed has a good reputation. We interviewed the director of another finance academy and heard an identical story; the program graduates only 34 students, the number of seats in one classroom. Other students remain in the program but do not get into internships or advanced classes. Over half of the programs we visited used some variation of this process of setting a fixed size for its junior class and then admitting enough students to make sure they had enough talented students. In the third case, the class size was limited by technological resources to only twenty. The programs all chose to admit a considerably larger number of students, guaranteeing that most students entering the program would not be allowed to finish it. The dropped students were provided the opportunity to continue in high school either by being in the program in name only and taking the same sort of courses that any other high school student would take, or by being provided an alternate set of courses in a "safety net" program. Whatever the solution, the fact remains that when admissions decisions were being made, they were made by counselors who knew what percentage of these students would finish the program to which they were being admitted. Several program heads said that there were no dropouts from their program, but they were most likely referring to the third and fourth years, when their student body had already been drastically winnowed down.

One program claimed to allocate the same number of seats in each grade, ninth through twelfth. Asked what their dropout rate was, the program head announced that it was zero; it had to be or else the upper classes would be underenrolled. Clearly there must be some exaggeration here, but they were under self-imposed pressure to hold on to as many students as possible from ninth through twelfth grades.

Does Forcing a Career Choice in Eighth Grade Increase the Dropout Rate?

It is possible that the basic idea of the career magnet high schools—that students can make wise career choices in eighth grade—is flawed. Perhaps a number of students drop out of school because they realize that they have made the wrong choice; however, changing career goals need not lead a student to drop out.

In our interviews (Flaxman, Guerrero, & Gretchen, 1997; Heebner, Crain, Kiefer, & Si, 1992), we met a number of students who came to realize that they had no interest in a particular career once they had learned a little more about it: "I thought I would like accounting, but it turned out just to be all math. I wound up hating it." Other students talked about planning a different career while they were in high school studying for a career in which they had already lost interest. It seemed that many of these students were able to learn a lot about careers and themselves in the process of

making a change. We often concluded that being trained for what turns out to be the wrong career ended up being a better educational experience than they would have had in a comprehensive high school. This does not mean, however, that the students themselves understand this as they are going through the turmoil of adolescent career-identity-formation at the same time.

Moreover, it may take students more than two years to reach junior-year status, when internships and the academic career focus begins. As a result, and this is probably true of other urban districts, reliable graduation statistics require waiting until students have had the opportunity to be in high school seven years. The number graduating "on time" at the end of four years is small—only about 40% graduate that quickly. This mirrors the pattern in college, where graduation rates can be estimated only after students have had time to drop out and return, to carry reduced schedules because of working, or to take the high number of courses required for graduation in a particular major. Many college programs frankly admit that it is not possible to complete all the requirements in eight semesters. This same pattern is appearing in high school as academic standards are being continuously raised by state legislatures and through pressure from the federal government. Raising the performance bar by requiring students to pass multiple tests for graduation and (in the programs we studied) adding more coursework and internships slow down graduation. Students are not rushing to graduate so that they can take high paying jobs at the age of 18—there are very few such jobs—but there are more part-time jobs for high school students, which also tends to delay graduation. Furthermore, the increased pressure on all students to graduate from high school means that students who fail courses are under great pressure to remain in school and retake classes, which can also lead to added years of high school.

One factor that may increase dropouts in career magnet programs is the stretching of the number of years between entering high school and achieving junior-year status, when internships and career courses become available. The student who cannot accumulate enough credits or pass enough examinations to move quickly to junior-year status is at high risk of dropping out, and this could be a major explanation for the high absenteeism of students in the first two years of the career magnet schools.

Coping with the Tradeoff Between High Standards and High Graduation Rates

It seemed to us after visiting a number of academic career magnet programs that many had made a choice, whether conscious or unconscious, either to emphasize excellence or emphasize holding students in school. It is human nature to assume that when two goals appear to be contradictory, an effort to pursue one will take energy away from the pursuit of the other. In our study, however, programs that produce high performance on

standardized tests do not necessarily have higher dropout rates; the correlation between a program's impact on test performance and its impact on the dropout rate is small.

Most educators, including program administrators, showed a genuine commitment to all of their students, and this came through in our interviews. They were proud of their low dropout rate, although they often calculated the rate by looking only at seniors, rather than the entire period of time students spent in their program. Those staff and administrators who ran a program with a low four-year dropout rate were proud of their accomplishment. On the other hand, the program administrator of the finance program discussed above justified his willingness to discard two-thirds of the students admitted to the program at the end of their second year by arguing that they probably were not very interested in finance but used it as a device to get into a better comprehensive high school than the one in their own neighborhood. This comment, which is part truth and part rationalization, was heard often enough to make it clear that program administrators knew that dropping students is a moral act. Others talked about taking risks such as selecting a student for an internship despite his or her sometimes poor performance in the past. We watched teachers select the weakest student in a group to be its leader in an effort to bolster the student's self-esteem.

While some programs take pride in their demanding standards, others take an equal amount of pride in holding students in school who might otherwise have dropped out. The director of a veterinary science program said that providing students with an opportunity to take care of animals gave them a strong incentive to stay in school; although sending a small number of students to high-quality colleges was important to the staff, it was clear that helping students graduate was also a clearly defined part of the program's mission.

The evidence of trying to keep students and the discomfort in talking about dropouts is important because it shows that policymakers have a large reservoir of commitment to draw upon, if they can only devise strategies that will reduce the cost of keeping the weak students. All program administrators would like to find a way to place their most gifted students in industry or a good college and still encourage their weaker students to remain in school.

Employers are being rational when they demand that schools send them only their best students. Students with stronger academic skills generally make better employees. Since career magnet programs must evaluate students in order to decide which ones qualify for internships, it seems inevitable that the academically stronger students will have the advantage, and the academically weaker students will be passed over. While this does not mean that academically weaker students must drop out of career magnet programs, it does mean that a special effort has to be made to keep them in

the school. Preference for high-achieving students may be inevitable, but a low graduation rate for low-achieving students is not.

How do students who do not make the grade finish their schooling? We were surprised at the complexity of the answer to this question. In some programs lodged in comprehensive schools, program administrators stated that they were not permitted to expel a student from school simply because they have not been selected to stay in the program. Even though the student had come from a distant neighborhood, he or she would remain in the school rather than return to the neighborhood school; however, other program administrators in the same situation said they were required to return them to their neighborhood school.

Certainly, forcing students who had not been selected for career training after their second year in high school to return to their neighborhood schools would be expected to increase the dropout rate. Students who change schools are more likely to drop out, and this is as true for career magnets as for students in other schools in the district. In situations like the finance academy discussed above, where two-thirds of the students do not remain in the actual program after their sophomore year, those who remain in the same building will have friends in the classes they take after leaving the program—either comprehensive students they knew from previous classes or extracurricular activities, or other dropouts from the program. Thus, their chances of staying in school are higher than if they were to change schools.

Buildings made up entirely of career magnet programs have a different problem because they have no place to send students who have been dropped from their program. Some of these programs do not drop weak students; instead, they modify the program to accommodate the students. For example, one business program retains its weak students but assigns them to in-house internships, where they work as clerical staff within the school. Obviously, this kind of internship has less of an emotional lift for students, but it avoids dropping them from the program.

Shifting Students Into Different Programs

This kind of dual-focus program, where the program administrator must simultaneously focus on placing the best students in the best internships and providing remedial effort for the weaker students, is difficult. In many cases, the easier solution is to create two separate programs, each with its own administrator, that will be able to serve the two different levels of students. In the business school with the dual-focus accounting program, there are other programs that focus on students with different levels of performance. The highest level students often are placed in the programs intended to send students to college, while weaker students are placed in the programs focused on lower-level entry positions. This strategy seems to increase the graduation rate without sacrificing program quality. While

most cases would involve dropping students from the college track to the entry-level-job program track, program administrators and other staff members informed us that in some cases, students are transferred from the lower-level to higher-level programs. This is particularly noticeable in the Health Careers magnet we observed, where the best students are pulled out into the pre-collegiate program at the same time that weaker students are sent into the medical office training program.

Enhancing Teaching

There are a variety of strategies for dealing with the inevitable wide range of student ability found in a classroom. Some programs use team projects such as cooperative learning. Table 2.8 indicates that team projects may succeed in helping to keep students in school.

Other programs successfully use technology to keep students in school. A good example of the latter is an accounting program in a career magnet school that has high standards and expects nearly all of its students to go on to college. Students who have difficulty with accounting are "pulled out" into a remedial accounting class in which computers are used to help students understand the abstraction behind more difficult mathematical formulae. According to the program administrator, this enables students to catch up and join the rest of the class by the following year.

Table 2.8. Percentage of Average Achievement Students Dropping Out in Third Year of High School, by the Program's Use of Student Projects

	Lottery Outcome		
Student Projects	*Win*	*Lose*	*Difference*
High	2%	4%	-2%
(n)	(797)	(2,023)	
Low	5%	3%	+2%
(n)	(720)	(2,481)	

Note: Significance test: Program level data, $t = -.334$, $p = .05$, $n = 35$

Career Counseling

There is evidence that programs with counselors who specialize in career advisement have more success holding their lowest achieving students. Students who were reading below grade level in seventh grade and won the lottery to a program with career counselors are less likely to drop out of school. Table 2.9 shows a 7% higher dropout rate when students win the lottery to attend a program with few or no career counselors, but no increase in dropouts if they win lottery admission to a program with more career counselors.

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As students reach these frustrating last years of high school, trying hard to accumulate enough credits for graduation or to pass mandatory examinations, their career counselor may be giving them useful advice and moral support, perhaps urging them to stay in school by pointing out that there are careers in this field that do not require high-level academic skills. Table 2.9 shows the lower dropout rate of students who won the lottery to enter schools with more career counseling compared to those who won the lottery to enter a program that had less.

Table 2.9. Percentage of Below-Average Achievement Students Dropping Out of High School, by Amount of Career Counseling in Their Program

	Lottery Outcome		
Career Counseling	*Win*	*Lose*	*Difference*
More	33%	31%	2%
(n)	(127)	(352)	
Less	32%	25%	7%
(n)	(219)	(495)	

Note: Significance test: Program level data, r = -.421, p = .02, n = 29

Solving the Problem of Lower-Grade Absence

Sometimes students discover quite early, even in an introductory ninth-grade class, that they have chosen the wrong career; yet students who are happy with their choice also have problems. Asking a student to commit to a career in eighth grade and then postponing most career courses until the last two years of high school sets that student up for disappointment, especially for the large number who dislike traditional academic classes and want to begin their career studies right away. The following are a few ways in which some programs seem to be successful at helping these students:

Adding an Academic Career Focus in the Early Grades

Some career magnets have tried to maintain student interest during the lower years of high school by creating introductory courses in keyboarding and computer work. Others have devised ingenious ways to incorporate the academic career focus into elementary courses (such as teaching aerodynamics with a strenuous paper-airplane competition). Others introduce career-related material into some of their academic ninth- and tenth-grade courses. Some use a variety of guest lectures and visits to work sites as a way of introducing students to their future careers. These techniques seem promising. We have no hard evidence that they succeed, but they merit a more thorough evaluation than we were able to do.

Career Counseling

Although our only positive findings that career counseling is valuable was for students reading below grade level in the seventh grade, we believe career counselors are also valuable for the average student as well. If students feel from their first class in a field that that career is not what they thought, a career counselor can reassure them that their original interests in their field were not based on misconceptions. If they are frustrated by not having enough hands-on career work, a counselor may be supportive and encourage them to do career-related work after school. If students really are locked into a career they are uncomfortable with, a career counselor can encourage them to look at a particular career as a short-term plan, a way of supporting themselves while they go to college. Since most high school students hope to go to college, this is a strategy with wide utility; a number of students we interviewed talked about using their present career training as a way of paying their way through school, or as a back-up career if their long-term goals do not work out. Some of the teachers and counselors in career magnets encourage this sort of thinking.

Shifting Programs

Sometimes a school can simply move the student into a program with a different focus. Students who looked forward to a health career but are missing school because they cannot stand the sight of blood might, for example, do well in a program that trains them to work in a medical office.

Incentives: What Governments and Markets Can Do

Students of government and educational policy usually complain about the overregulation of schools, but in the case of career magnets, the role of government has often been helpful, and there are certainly examples of how schools and programs, when left alone, fail to serve all their students well. In many cases, government action may be beneficial in an unexpected way. In the past two decades, critics of government have argued that the market is a better source of incentives because clients can "vote" for programs that seem most helpful to them. In this section, we mention a few examples of governmental and market incentives that have affected, or could affect, career magnet programs.

One of the factors intended to work to the advantage of low-achieving students is the Perkins Act's requirement that the schools receiving vocational education money educate their students in "all aspects of the industry." The phrase, inserted in the bill as a result of the lobbying efforts of the Center for Law and Education, was intended to make sure that vocational students were prepared not only for the bottom rung of a particular industry but were also taught about the technical and managerial side of the work as well.

While every bricklayer cannot become a private masonry contractor, the school should at least not stand in the way of their students' effort to move up the career ladder of an industry. Perkins has had no effect on career magnets because these programs receive no vocational education funds; if they did, each career magnet would feel pressed to make sure that it had programs covering a wide range of activities within its chosen industry.

In the absence of federal pressure, student applicants have exerted market pressure. Many choose career programs with a precollegiate flavor. In response, some program administrators and staff have developed programs or sets of programs that hold out the promise of college to all while at the same time making sure that they have courses appropriate to a wide range of student abilities. The easiest way of doing this is to teach students about a range of careers within a single broad industry. Thus, for these programs, focusing on all aspects of an industry can be used as a recruiting tool, offering preparation for high-quality post-college employment. Such a broad academic career focus can also benefit students who are not skilled enough to obtain a college degree or a high-quality internship. If schools provide information and internships in some of the intermediate and lower-level positions in their field, students will be able to begin at the bottom even if they cannot jump-start their careers by obtaining a college degree. This also means that programs that train students in all phases of an industry will necessarily have a "safety net" career line of training that could keep potential dropouts in school.

A stress on all phases of an industry also encourages students to think about related fields that require different skills. Industries can accommodate a wide range of student interests. For example, even a highly technical field such as engineering has room for people with strong interpersonal skills and less interest in analytic work.

Incentives: School Size

When some entire high schools became career magnet buildings, the schools became large enough to accommodate a group of related programs, and some school planning committees took advantage of the opportunity to teach all phases of an industry. The schools that did this seem to be the most successful. The one total career magnet school that is an exception, creating four unrelated programs within the same school building, has had more difficulty holding down its dropout rate. In another example, local and state governments required programs to take a quota of students with low reading test scores; this created an incentive for some programs to develop anti-dropout strategies, including creating safety net alternatives.

When the city Board of Education agreed to allow comprehensive schools to create career magnet programs, the incentive was to keep the programs small, since schools usually have little empty space in which to work. As a

result, comprehensive schools were unlikely to develop dual-focus or safety net programs.

Incentives: Targeted Budgets

School district administrations (and, more commonly, the state or federal government) create incentives by providing separate streams of funding dedicated to specific tasks or specific groups of students. For example, a large number of high schools provide a special education version, or non-English language version, of the career magnet program created for regular students. We also noted that the computer-assisted accounting program grew out of a special district fund for reducing dropouts.

Conclusions

Our most important conclusion is that these career magnet high schools have a lower graduation rate than do comprehensive high schools. We have uncovered three explanations for the lower graduation rate in the career magnet schools:

1. The career magnet schools are academically more demanding than the comprehensive high schools.
2. This is especially true in those programs concerned with qualifying students for specific jobs.
3. The career magnets enforce these high standards and thereby limit the number of students who may receive the "real program" to only a fraction of the students that they admit. Thus, they plan for a high program dropout rate, although most of those who drop from the program do not necessarily drop out of school.

We have identified three strategies that seem to reduce the dropout rate: First, and most important, is the creation of a safety net that can catch those students who are dropped from a program. Second, the dropout rate seems to be lower when students are involved in individual and group projects. Third, dropout rates seem to be lower in schools that devote more resources to career counseling.

While all three efforts are important, the creation of the safety net is most important because of the large number of students who are dropped from programs—in fact, if not in name—and have no other program to enter.

The Lottery and Accountability

The area's public high schools are loosely coupled to higher levels of government. This research project has found that there are important roles

for the government to play. First, gathering statistics is important. The fact that there are good statistics on the number of students passing required tests, and poor statistics on graduation rates for each program is an important reason why a great deal of attention is paid to the first and a lot less to the second. In the absence of good data, each program administrator we interviewed assumed that he had a relatively high graduation rate compared to other schools. Like Lake Woebegone children, every program administrator thought his or her program was above average.

The lottery admission strategy provides an excellent opportunity for administrative oversight of the program. It is rare in education to have a clear "bottom line" accounting system to determine the success of a particular school. The lottery provides precisely that opportunity. The fact that academic career magnet applicants who win the lottery are more likely to succeed in college (at least, this is true for the four career magnet schools we studied in detail) indicates that these programs are successful. The lower graduation rate of the students who win the lottery as opposed to those who applied to the same programs and lost the lottery presents an opportunity for higher-level administrators to ask for action. As with most other school districts in this country that serve low-income minority areas, the district's schools are often indicted for the poor test scores of their students while, in fact, they may be doing an excellent job of "adding value" to the performance of their students. Conversely, schools that serve a middle class nonminority population may brag about the high rate of graduation and college placement among their students while actually providing these students with little more than they brought with them from home.

There are other areas where higher-level administrators might play a role. For example, this research project has found that some schools succeeded because they had linked multiple programs. A school board planning to stimulate the growth of career magnets could provide technical assistance on the value of this approach. The central office can also be helpful by developing a student record system that could be used to evaluate the effectiveness of schools-within-a-school by recording the name of both the school and the program in which a student is enrolled. This would allow the administration to identify successful individual programs within an otherwise poorly performing school, or vice-versa.

Incentives and Independence: Career Magnets as Charters

Some of the strength of career magnet programs derives from the fact that they are much like charter schools. Program directors have the opportunity to fulfill their own vision of what a high school experience should be like. They do not have as much control as they need or would like, especially in recruiting staff, but they have control of their curriculum in important ways. They have "ownership" in a way that other educators—

even high school principals—do not. As a group, program heads are ambitious, know they are competing for students, and are committed to creating exciting educational environments.

But it is apparent from the schools' experiences here that the free-market model has its downside. Programs do compete for students; they "advertise" in the school districts high school directory. But they compete for quality, not quantity. Programs want large numbers of applicants so they will have a large pool to pick from when they select half of their entrants. Similarly, they also want a large entering class of ninth graders so that they will have a large pool from which to select its small junior class. Program heads do not attempt to "maximize their profits" by increasing enrollments. Instead, they maximize their satisfaction if they can feel they have "made a difference" with a group of students, preferably talented, whom they know personally. Because there is little incentive for program heads to increase the number of students who complete their program, the system seems to expand mostly by new programs being created. There are over 130 career magnet programs and several hundred other types of programs. The impersonality of the traditional high school is surprising; we interviewed teachers who were nominated by students as their "most influential adult" in school, only to find that the teacher was unable to recall the student at all. The same is true in the larger career magnet programs, which may have several hundred students. All this suggests that the smaller career magnet programs should be more successful because the program head will have more personal contact with all the students, increasing both the students' sense of being supported and the program head's sense of satisfaction. In Chapter 4, Sullivan and Little find evidence supporting this hypothesis.

The Seven-Year Curriculum

The large number of older students in high school presents some important challenges to the school. Given the high unemployment rate among disadvantaged youth and the rigorous academic standards applied in the these high schools, it is only logical that more and more students will be using a fifth, sixth, or seventh year to complete their high school requirements. It is not clear to us whether this situation has been recognized as either an opportunity or a problem. In our discussions with school administrators, the role of the high school as a seven-year school has not come up. The issue should be put on the public agenda of secondary education.

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CHAPTER 3

The Academic Effects of Career Magnets

Robert Thaler and Robert L. Crain

Most American high schools have long been structured on the premise that academics and vocational education should be kept separate. That model is rapidly breaking down. With skilled blue-collar jobs moving overseas and the service sector growing, working class jobs require higher levels of literacy. A new movement is endorsing that—even for the college-bound—the right approach is "contextualized learning"—that is, the integration of career and academic preparation (Berryman & Bailey, 1992; Resnick, 1987). Others argue that the high school curriculum has no time in its college preparatory track for non-academics—that college-bound students are losing the achievement race with Europe and Asia and that even students not destined for college need higher levels of literacy and numeracy in order to work in the service sector. The issue is time—the school day is a pie of a given size, and reallocating a larger portion to careers cuts into academics. These critics have a point: The great improvement in cognitive performance of the American population over the last century has been largely the result of increased school attendance and, hence, more years of "time on task."

Proponents of school-to-work programs in high school argue that there are "slack resources" in school because adolescents are not motivated by traditional academic programs and do not spend much of their time learning; anything that shows students a connection between academic learning and their future will increase their interest in school and take time away from television and sleeping in class. It seems unlikely that this debate has any simple answer. It is more likely that there are some ways in which a school-to-work program encourages higher academic performance, and others in which it is harmful.

We have been provided a unique opportunity to measure the impact of academic career integration on academics. We have test score data along with descriptions of the programs that students applied to for almost eight thousand students who were randomly divided into career magnet and regular comprehensive high school programs. This is the largest test ever done of an educational program using random assignment.

Methods and Data

Independent Variables

The telephone survey of academic career magnet program administrators asked questions on 13 different topics:

1. Use of internships
2. Program emphasis on careers
3. Program unity (i.e., isolation of the program from the remainder of the school)
4. Job placement for graduates
5. Use of specialized (noncomputer) equipment
6. Previous work experience of faculty
7. Extracurricular activities designed to facilitate the school-to-work transition
8. Amount of counseling
9. Amount of academic counseling
10. Amount of career counseling
11. Use of computers
12. Student projects
13. Team versus individual project work

Administrators were asked to base their responses only on the students in their academic career magnet program, excluding students in other academic career magnet programs in the same building or in the school's regular comprehensive program, and students in any ESL/bilingual or special education programs. Of the 59 programs for which we had acceptable numbers for analyzing the experiments, only 49 were surveyed. One program had closed, and nine program heads refused to be interviewed.

One goal of the survey was to determine how successful academic career magnets have been in integrating academic and vocational education. We concluded that programs varied greatly not only in the particular type of academic career focus chosen but also in the extent to which they had implemented it.

Dependent Variables

The Student Records File contains student scores on standardized reading and math examinations and absenteeism. Because this file contains eighth-grade records, it allowed us to increase the amount of pretest information on each student to include both seventh- and eighth-grade outcomes. For the high school years, the Student Records File includes data on which standardized reading and math examination students were scheduled to take each year from the Fall of 1988 through Spring 1993, whether or not

they were absent on the day the examination was given, and their score on the examination. It also contains the number of days each student was absent each semester, the number of credits earned, and the school they were in each year, as well as dropout, transfer, and graduation data.

The minimum requirement for graduation is passing regular reading and math examinations, or one or more advanced versions of those examinations. Our data file contains these scores and also SAT Verbal and Math examination results. Students, either at their own discretion or that of their counselor, may take these examinations in any of the years covered by our Student Records File. As a result, the number of students in any one of the three reading levels taking a particular examination in a specific year may be small, even though we have data on 7,987 students who applied for admission to 49 programs in the Fall of 1988.

Analysis

Since each reading level is a separate experiment, our analysis must be done separately for each. Two-thirds of all students fall in the average group. We present the data in the following two ways:

Step A: The first is a zero-order Pearson correlation, computed across the 49 programs between the extent of a career program component and the "program effect," and the performance of applicants to the program who were lottery winners compared to the performance of lottery losers among the applicants, both adjusted for seventh- and eighth-grade academic performance. This is the "perfect" experimental result in that it is unbiased. Being unbiased, it includes students who were randomly selected into the "experiment" and "control" groups but did not actually experience the "experiment" or "control" treatments. As already discussed, some lottery winners (29% for whom we have student outcome data) did not attend their first choice academic career magnet program, and some of the lottery losers (18.3%) received the experimental treatment because they went to the academic career magnet. This raises the possibility, admittedly slim, that a significant correlation is the result of a difference between the so-called "experimental" and "control" subjects who, in fact, were not actually in the treatment and control groups (i.e., we might have students who won the lottery and went to a highly selective school or to their comprehensive school and who strongly outperformed students who lost the lottery but actually went to the academic career magnet program!). Even so, a significant correlation between a program having a particular characteristic and the program having a high or low examination score is the strongest possible evidence that the relationship is present in these programs.

Step B: To estimate the actual magnitude of the effect (and as a check for the possibility of the assignment errors discussed above creating a false positive finding), we computed mean test scores from the individual data file, comparing the individuals who won and lost the lottery, but separating

those winners who did not go to the program and also those losers who did go. These tables are no longer an unbiased experiment, but they provide a measure of the size of the significant program-level correlations found in Step A.

Procedure for Step A: Since each career magnet program provided up to three separate randomized experiments (one for each seventh-grade reading level), we were able to construct outcome measures comparing the randomly admitted students (including those that did not go to the career magnet) to the randomly rejected students (including those who did go to this or another career magnet program). We correlated the presence or absence or magnitude of particular program characteristics as reported in the Program Administrator Survey with each program's value of (i.e., mean performance of lottery winners minus mean performance of lottery losers) from the Student Records File. Since the true number of degrees of freedom should be based on 49 (the number of programs), and not 7,987 (the number of students), we aggregated the data to the program level.[3] The apparent effect of each program was measured by computing a pretest-adjusted score, adjusted by regression for seventh- and eighth-grade standardized reading and math scores, grades, and absences, for each student outcome. The mean for all students who applied to each program as their first choice and lost the lottery was subtracted from the mean for all first choice winners to the same programs.

Findings

Academic career magnet program students do not have higher or lower reading scores, take advanced graduation examinations more or less often, or have higher or lower absenteeism. They do seem to have slightly lower math scores. Proponents of school-to-work will be disappointed by this, since many of them have been arguing that adding an academic career focus should enhance academics by increasing student motivation and integrating academics and careers. Advocates of choice will also regret these results since they expected the schools to perform better simply because the free market should have weeded out the academically weaker programs. Also, many social scientists would have predicted that students choosing these programs would gain a sense of ownership that would translate into higher motivation. On the other hand, many advocates of school reform who have had their expectations tempered by program failures in the past will be reassured that the career magnets were able to introduce the

[3] Aggregation is also useful because, as Glenn (1994) notes, random fluctuations at the individual level will generally cancel one another out and not interfere with the correlation in the aggregated data.

academic career focus and all its attendant work on student adolescent development without examination scores declining.

We located two factors with quite powerful effects on academic achievement in some of these programs: (1) bringing the workplace into the school and (2) bringing the school into the workplace.

Bringing the Workplace into the School

Computer Usage

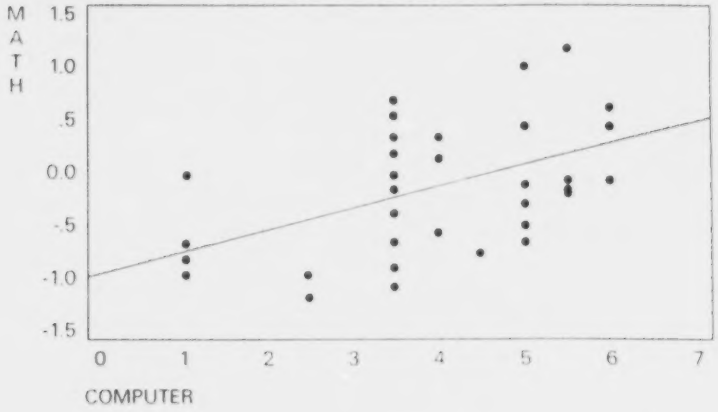
One way that academic career magnets bring the workplace into the school is by importing the technology of the workplace and its culture. Computers are becoming ever more ubiquitous in every occupational field. Whether in an office or on the shop floor, employment requires knowledge of and experience with computers. As a result, computers are not only part of the technology of production in the workplace, they are also increasingly part of the culture of the workplace. In our 1991 survey, 90% of the program administrators indicated that their students used computers either in classes or in a computer lab; however, the number of computers available in each program varied greatly, as did the regularity and extent of their usage by students in the program. A variable, Computer Usage, was constructed from five questions asked of program administrators: Do students in the program use computers? If yes, how many computers are available to students? What proportion of students use computers in a typical week? How many hours per week do students at each grade level use computers? To what extent do students in this program use computers compared with the rest of the school?

Figure 3.1 shows a plot of the effects of 34 academic career magnet programs (those which had sufficient cases for analysis) on the standardized mean difference in 1990 Regular Math Exams (net of seventh- and eighth-grade test differences) against the extent of computer usage in that program. The horizontal axis is the extent of student computer usage from a low of zero to a high of seven on the questionnaire scale. The vertical axis is the mean score of all lottery winners applying to the program minus the mean score of all lottery losers applying to the program.

The first thing to notice in the plot is that the "program effects"—the performance of a program's lottery winning applicants minus the mean score of the lottery losing applicants—are as often negative as positive. Since the "n"s are small in some of these experiments, there is considerable sampling error, but it is still interesting that there are 11 programs in which lottery losers outperform lottery winners by over .5 standard deviations, and only 6 programs in which lottery winners outperform lottery losers by this much. (This pattern appears on other tests of both reading and math.) Even more interesting, however, is the size of the correlation between computer usage and the program effect on 1990 Regular Math Exam pretest-

adjusted scores. All seven of the programs with high computer usage (scores over 5) have neutral or positive program effects, but five of six programs with low computer usage (below 3) have clearly negative program effects.

Figure 3.1. Lottery Winner-Loser Differences in Aggregated Standardized 1990 (Spring of Second Year of High School) Regular Math Exam Pretest-Adjusted Scores by Computer Usage



Note 1: The dot just above the regression line at computer usage = 5 represents two programs.

Note 2: The program-level correlation for this table is r = .51 (p = .02).

The plot and correlation are impressive. From the plot, we can estimate that the effect of winning lottery admission to a low-computer usage academic career magnet program (programs ranked below 4 on our scale of computer usage) is to lower 1990 Regular Math Exam pretest-adjusted scores by about five-tenths of a standard deviation (about 50 SAT points) below what would be expected of similar students in other high schools, and the effect of being in a high computer usage academic career magnet program (programs which ranked 4 or higher on our scale) is to raise the 1990 Regular Math Exam pretest-adjusted scores by about one-tenth of a standard deviation. When we look only at the seven programs with the highest computer usage, we see a stronger positive effect of winning the lottery, on the order of one-quarter of a standard deviation. Since some lottery losers did enter academic career magnets by school selection, the difference between career magnet programs and comprehensive schools is attenuated, and the apparent difference between the impact of high-lottery and low-lottery programs is an underestimation. In Appendix B, we estimate that Figure 3.1 and other figures like it underestimate the effect of

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computer usage (or any other program attribute) by about one-half of a standard deviation.

Although we are primarily concerned in this section with the contribution of computer use to raising examination scores or preventing them from falling, the most important finding in the figure is the lower scores of most career magnets. We think the most likely explanations are the same as we made for the low graduation rates in many career magnets: (1) that career magnets ignore many of their weaker students, and (2) that comprehensive schools are pressed to keep scores up, but career magnets are not because the necessary data is not made available.

The next analyses confirm that computer use holds examination scores up. We present a number of tables displaying large and statistically significant findings, supported by other tables that sometimes have large but not statistically significant findings. We have relied heavily on program-level data, since it is the most accurate way to measure the effects of the experiment, but this usually means that we have data from only 34 programs, so only extremely large findings, such as the relationship in Figure 3.1, will be statistically significant. Even some of the individual-level analyses have as few as 100 cases because we are selecting certain subpopulations to make various points.

Table 3.1 presents our second way of looking at the data. This table is based on individual data for the 1,470 average reading-level students who took the Regular Math Exam in 1990, and compares students who applied to programs that (1) had high or low levels of computer usage, (2) either won or lost the lottery for admission, and (3) did or did not attend the career magnet to which they applied. Looking at the first column, we see that students who applied to programs that do not use computers very much (this includes a number of pre-law and more academic programs) are the sort of students who score slightly better than expected on the 1990 Regular Math Exam. The bottom row shows that those who lost the lottery and did not attend the career magnet program (mostly because they were not admitted) scored about .06 above the average student in the test pool, adjusted for seventh- and eighth-grade examination scores. Those who lost the lottery and attended the career magnet (these were all school-selected) should be above average in talent and their small positive gain in math achievement should not surprise us. Those who won the lottery but elected not to go to the career magnet school tend to show scores typical for students with similar pretest scores (.03 standard deviations below average). But students who won the lottery and enrolled in the academic career magnet programs with low computer usage tended to score quite badly, almost a quarter of a standard deviation below expectations, and even lower when compared to lottery losers. In fact, they performed below lottery losers who did not attend their academic career program by school selection by [(-.23) - (+.06)] = .29 of a standard deviation. The second column tells a

different story for students who applied to high-computer-usage programs. The fourth row shows that they tend to be average students since those who lost the lottery and did not attend an academic career program have only average scores, and the third row shows that those students who lost the lottery and were school-selected into the high-computer-usage programs also have typical scores (-.01 and -.03, respectively). Students from this group who won the lottery and attended an academic career magnet performed slightly above average (+.07). Students who won the lottery but selected a different school also did slightly better than expected, perhaps because they had the academic talent to be offered seats in highly selective career magnets or other career magnets with strong mathematics programs.

Table 3.1. Regular Math Exam Standardized Pretest-Adjusted Scores for 1990, Average Reading Level

	Computer Usage		
Lottery	*Low*	*High*	*Difference*
(WG) Win & Go	-.23 (208)	.07 (100)	+.30
(WN) Win & Not Go	-.03 (68)	.06 (36)	+.09
(LG) Lose & Go	.05 (100)	-.03 (92)	+.08
(LN) Lose & Not Go	.06 (511)	-.01 (370)	+.07

Our best estimate of the effect of high computer usage in these academic career magnet programs is based on the third column of the table, which shows the differences between the data in columns 1 and 2. The difference in the bottom row is between lottery losers who did not attend their career magnet choice, mostly because they were not admitted; the difference is slightly negative, dLN = -.07, suggesting that the pool of applicants to the high-computer-usage programs was slightly weaker than the pool of applicants applying to the low-computer-usage programs. But among the students who won the lottery and chose to attend the career magnet school, there was a large difference favoring the high-computer-usage programs: dWG = (+.06) - (-.23) = .30 s.d. Our best estimate of the effect of the career magnet is D, defined as D = the difference between the performance of students who entered high-computer-usage programs compared to those entering low-computer-usage programs, dWG, adjusted for the apparent selection bias, dLN: D = dWG - dLN = .30 - (-.07) = .37 standard deviations.

The estimate is consistent with the estimate shown in Figure 3.1. Although the results are not unbiased (because they pool students from different experiments), it is also not as attenuated as the plot in Figure 3.1 is. While the "n"s in Table 3.1 are small, the results are consistent with the

plot and seem plausible.[4] Figure 3.1 and Table 3.1 indicate that heavy use of computers will offset the considerable loss to be expected in career magnets, which are usually focused on non-academic careers. Both show the largest effect to be a negative one for students attending career magnet programs with low computer usage. The -.23 in Table 3.1 is the largest effect, and looks similar in size to the average of the effects of the career magnets with low computer usage in Figure 3.1.

Table 3.2 shows a slightly weaker relationship for 1991 test results, consistent with the program-level correlation in 1991 of .366 ($p = .046$). Figures presented are again standardized adjusted scores and show that lottery winners in academic career programs with high computer usage have scores one-fifth of a standard deviation (dWG = .20) above those of winners attending programs with low computer usage. Whereas in 1990, the benefits of higher computer usage resulted from a small gain in achievement in high-computer-usage programs coupled with a large loss in low-computer-usage programs, in 1991 there was no loss in the low-computer-usage programs and a large gain in high-computer-usage programs.

Table 3.2. Advanced Math Exam Standardized Pretest-Adjusted Scores for 1991

	Computer Usage		
Lottery	*Low*	*High*	*Difference*
(WG) Win & Go	.00 (59)	.21 (54)	+.21
(WN) Win & Not Go	-.24 (14)	.32* (17)	+.56
(LG) Lose & Go	-.15 (81)	.05 (93)	+.20
(LN) Lose & Not Go	-.01 (240)	.00 (187)	+.01

Note: Students who chose not to accept their lottery admission may have attended a selective academic career magnet. While the standard math examination is required for graduation, students may choose to take the more difficult advanced examinations in one or more of three different areas of mathematics.

[4] In Figure 3.1, the median score of all programs with computer usage above the mean (usage > 4) is -0.1; the median for all programs below the mean level of computer usage is -0.6; since these medians are not adjusted for the standard error of the estimates for individual programs, and the programs with the most extreme scores are no doubt those based on the fewest cases, this technique should give us a larger estimate of the effect of computer usage, and it does: .5 is greater than the .37 obtained in the individual level analysis in Table 3.1.

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At first, it was thought that programs with high computer usage might be using computers to teach math; however, in visiting programs, we found little evidence of this. There is possibly something about learning how computers function, such as logic, which is transferable to math, but we have no way of studying this hypothesis with our data. However, we were able to test a third hypothesis—that computers improve student motivation.

All of the data we are using on our individual file come from the school district's official records for each student. This file contains no data on class-cutting; however, it does contain a record of which students were absent when they were scheduled for a standardized reading or math examination. For each program, we computed the extent to which lottery winners were absent from these examinations more or less often than were students in the control group, adjusting for any random seventh- and eighth-grade background differences. We then correlated this measure of program effectiveness in reducing examination-cutting with each program characteristic, using reduced examination-cutting as a measure of increased motivation. Students in high-computer-usage programs were less likely to be absent when standardized reading and math examinations were given.

Table 3.3 shows the proportion of students present for whichever standardized reading examination they had signed up to take in 1991 by the level of computer usage in their career magnet program. The aggregate file correlation was .304 ($p = .081$). Table 3.3 shows that students in programs characterized by high computer usage are 9% ($p < .05$) less likely to be absent for a standardized reading examination (dwg) than are students who won the lottery to low-computer-usage programs. Note that dLN = 3%; this difference among lottery losers favoring applicants to high-computer-usage programs suggests a selection bias, that students who apply to high-computer-usage programs will be less likely to miss a reading examination no matter what school they attend. We estimate that, corrected for selection bias, the true program effect is D = 9% - 3% = 6%.

Table 3.3. Percent Present for Reading Examinations in 1991

	Computer Usage		
Lottery	*Low*	*High*	*Difference*
(WG) Win & Go	74% (434)	83% (276)	+9**
(WN) Win & Not Go	72% (194)	80% (100)	+8*
(LG) Lose & Go	85% (329)	86%	+1
(LN) Lose & Not Go	77% (1,389)	80% (1,048)	+3

* See note for Table 3.2.
** $p < .05$

Since absenteeism falls between 18% and 25% on these examinations, 6% represents a one-quarter reduction in absences.

Table 3.4 is similar to Table 3.3 except that it concerns the proportion of students present at standardized math examinations that year. Based on an aggregate file correlation of .367 ($p = .036$), it shows that lottery winners to programs high in computer usage are 8% less likely to be absent from a standardized math examination than are students who won the lottery to programs low in computer usage. This is a one-third reduction in absences, and, in this case, there is evidence of a small selection bias against the career magnets, so our estimated effect is larger: $D = .08 - (-.01) = .09$ ($p < .05$). These findings support the hypothesis that increased use of computers enhances student motivation, and we assume that students with greater motivation pay more attention in class, study harder, and try to do better on their examinations.

However, we must test for the counter hypothesis that the correlation between increased computer usage and higher math scores or attendance on standardized examinations is the result of creaming by programs with high computer usage. By "creaming," we mean the artificial inflation of a program's performance by (1) discouraging weak students from taking the examination, (2) delaying students taking any of the examinations, or (3) encouraging strong students to take the examinations. To check this, we did an analysis of which students took the Advanced Math Exams in 1991. If higher scores on this examination are the result of creaming, one would expect to find one or more of the following scenarios: (1) The proportion of students taking an Advanced Math Exam in high-computer-usage programs is low compared to students in programs with low computer usage; (2) the proportion of students taking a second Advanced Math Exam is low; (3) the proportion of students taking a first Advanced Math Exam should be low; (4) the proportion of students who have taken one Advanced Math Exam, but are not taking one this year, should be low; and (5) the proportion of students who have never taken the

Table 3.4. Percent Present for Advanced Math Exams in 1991

	Computer Usage		
Lottery	*Low*	*High*	*Difference*
(WG) Win & Go	74% (255)	82% (146)	+8*
(WN) Win & Not Go	78% (106)	75% (59)	-3
(LG) Lose & Go	83% (190)	82% (180)	-1
(LN) Lose & Not Go	78% (769)	77% (620)	-1

* $p < .05$

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Advanced Math Exam and are not taking it this year should be high. We found no evidence of creaming.

Table 3.5 contains data on the four different possible test-taking patterns: the proportion of students in low- and high-computer-usage programs who are (1) taking their second Advanced Math Exam (some are retaking, but there are three separate math examinations so they may have passed different examinations in 1989 or 1990); (2) taking their first Advanced Math Exam; (3) not taking an examination this year after having taken one in the past (some of these students failed an Advanced Math Exam and are now taking the easier Regular Math Exam); and (4) the proportion who were not taking, and had never taken, an Advanced Math Exam. The top half of the table shows data in each of these four categories for students who won the lottery and chose to attend their first-choice career magnet school. (By definition, they must total 100%.) The bottom half of the table shows data for students who lost the lottery and did not attend their first-choice career magnet program. For brevity, we have omitted the two middle rows shown in Tables 3.1 through 3.4: the lottery winners who did not attend the career magnet, and the lottery losers who did attend the career magnet. The third column of the table, thus, only shows the two differences, dWG and dLN, defined in the discussion of Table 3.1. Computing D = dwg - dln, we see that the apparent effect of attending a high- as opposed to a low-computer-usage program is to increase the chances of a student taking a second Advanced Math Exam in 1991 by 3.4%, increase the chances they will take their first examination this year by .9%; increase the chance that they had

Table 3.5. Test for Selection Bias on the Correlation Between Program Computer Usage and Taking Advanced Math Exams (Average Reading Levels Students)

Proportion of Students Taking Different Math Examinations or Not Taking an Examination	*Low-Computer-Usage Program*	*High-Computer-Usage Program*
Win and go to career magnet		
% taking second Advanced Math Exam	5.7	9.5
% taking first Advanced Math Exam	5.1	6.7
% took Advanced Math Exam in past, but not taking it this year	8.3	10.3
% not taking Advanced Math Exam and have never taken it in the past	80.9	73.5
Lose and not go to career magnet		
% taking second Advanced Math Exam	8.0	8.4
% taking first Advanced Math Exam	5.7	6.4
% took Advanced Math Exam in past, but not taking it this year	7.3	6.8
% not taking Advanced Math Exam and have never taken it in the past	79.0	78.4

taken a regents examination earlier but were not taking one this year by 2.5%, and decrease the chance that they had not ever taken an Advanced Math Exam by the time they finished their third year of high school by 6.8%. In other words, 19.1% of lottery winners in low-computer-usage programs took advanced examinations while 26.5% in high-computer-usage programs took advanced examinations ($p < .05$). This is not because of some innate difference between the two groups in desire to take the examinations; applicants to high-computer-usage-programs who did not go to a high-computer career magnet are .6% less likely to take the Advanced Math Exam. This means the higher Advanced Math Exam scores shown for high-computer-usage programs in Tables 3.1 and 3.2 are despite the fact that the test-taking pool is one-third larger in high-computer-usage programs.

In addition to having higher math scores, average students who won the lottery to attend programs characterized by high computer usage were more likely to satisfy graduation requirements in reading than were lottery winners who went to programs characterized by low computer usage. The aggregate file correlation was .308 ($p = .073$). Students reading below grade level in seventh grade who won the lottery to attend programs characterized by high computer usage were found to have taken higher level reading examinations in 1991 and higher level math examinations in 1992 than similar students who won the lottery to programs low in computer usage (no table shown).

No significant correlations were found for students reading above grade level in seventh grade who won the lottery to programs high in computer usage. Since scores on standardized examinations are usually correlated with SES, we think that these students, regardless of the program to which they were admitted, are more likely to have access to computers outside of school. Thus, an increased use of computers in school might not have a significant effect on measures covered by this research. It may also be that these students are already motivated by their high grades and do not need the motivational boost from computers.

Specialized Career-Related Equipment

Our survey of program administrators asked whether students used other types of specialized equipment besides computers. Specifically, we asked whether the program had other types of equipment such as business machines or medical instruments that could be used to promote student career socialization. Among programs surveyed, half indicated that students did use such specialized equipment; however, there were basically no meaningful correlations of outcome variables with our scale of special equipment usage on the aggregate file. The use of special career-oriented equipment in this data set appears to have no effect, either positive or negative, on academic performance.

Computers and Specialized Career-Related Equipment

A variable was created to identify programs that used both computers and other specialized career-related equipment. Programs characterized as high in both computer and specialized career-related equipment usage correlated significantly with taking the Basic Reading Exam in 1990 (.522, $p = .007$); students should have taken that examination the year before. In addition, average students who won the lottery to attend programs characterized by high computer and special career-related equipment usage scored poorly on the minimum-for-graduation Regular Reading Exam in 1991 (-.379, $p = .060$) and generally failed to pass the Advanced Math Exam that same year (-.411, $p = .055$). They were, however, more likely to be present for whichever math examination they were scheduled to take that year (.442, $p = .029$). We think that programs characterized as high in computer and specialized career-related equipment are more career oriented than are programs that are high in computer usage but have no other specialized equipment. As will be discussed later in this report, beyond a certain point, concentrating on career preparation seems to reduce academic achievement.

Independent Projects

While computers and other special equipment are mechanisms for bringing both the technology and culture of the workplace into the school, independent and team projects can do this as well. Independent projects are naturally quite common in high schools for students who are expected to go on to college. Students receive term paper and science project assignments that enculturate the student into the behavior expected of them in college. What is different in this case is that in academic career magnets, such projects are also socializing students into the culture of the workplace.

Most program administrators reported that students had opportunities to do independent projects, and that the number of students taking advantage of those opportunities increases with grade level as does the number of hours per week students are expected to work on such projects. At present, we have no evidence that independent projects either help or detract from the academic achievements of most students. We found no pattern of significant correlations between programs ranked high on our scale for independent projects (based primarily on the number of hours students were expected to devote to such projects) and student outcomes on the aggregate file. While for this data set there is no evidence that the use of independent projects leads to an improvement in student academic performance or motivation, there is also no evidence that such projects result in lower academic achievement.

Teamwork

Another characteristic of academic career magnets that brings the workplace into the school is teamwork. Career magnet programs are as

likely to stress team projects as independent projects. Apparently this is done to help students develop interpersonal skills that presumably will be useful on the job after graduation. A scale of teamwork was developed based on the extent, according to program administrators, that students are involved in team projects as opposed to individual projects. We found no significant pattern of correlations, either positive or negative, between teamwork and student outcomes.

Bringing the School into the Workplace

Having a job placement service for graduates, an academic career focus, a faculty with work experience in the career, and school activities about future employment and internships are the characteristics of academic career magnets that bring the school into the workplace.

Job Placement Service

It is reasonable to assume that when students see others graduating and getting jobs based on the career training they have received, they perceive the career preparation aspect of their curriculum to be much more relevant to their lives. Program administrators were asked two questions about job placement: (1) Does their program help locate employment for graduating students, and (2) Approximately how many are actually placed in employment through the program? Thirty-four of 61 programs surveyed provided job placement services. Of these 34 programs, only 19 were able to tell us how many students were placed, and their responses ranged from two to 70. For these 19 programs, we computed a ratio of the number of students placed to the total number of students graduating from the program. Programs that did not provide placement were coded as zero. (The 15 programs that provided placement services but could not estimate the number placed were omitted.)

When student outcomes in the aggregate file were correlated with our scale of program placement, we found evidence that more job placement services weakened the academic performance of the program. In 1989, few students in such programs who were reading on grade level in seventh grade took the Basic Reading Exam ($r = -.793$, $p = .000$), and those that did performed poorly ($r = -.350$, $p = .042$). In 1991, students in programs with high placement had high scores on their Advanced Math Exam ($r = .331$, $p = .073$) and on the Math SAT Exam that same year ($r = .442$, $p = .085$); however, this was evidently the result of creaming. For students from this reading level cohort, there were negative correlations of placement with two variables designed to determine the difficulty of the standardized reading and math examinations taken each year. Though such correlations were never significant, the fact that they were always negative indicates that students in programs offering a high level of placement services were

not being motivated to do more than the minimum required for graduation and were not preparing for college.[5]

That the greater proportion of students in programs ranked high on our scale of placement services are evidently not preparing for college should not be taken as an indication of reduced motivation among those who took any of the standardized reading examinations for graduation. We found a correlation of .566 ($p = .000$) between our program placement scale and the proportion of students present for reading examinations in 1992. After removing lottery winners who failed to attend and lottery losers who were program selected, winners in programs that ranked high on our job placement scale, after adjusting for pretest variance, were almost 10% more likely to be present for this standardized reading examination than similar students in programs ranked low on that scale. The two-way interaction effect was significant at $p = .019$.

To provide a functional job placement service for its graduates, career magnet programs must develop a relationship with potential employers. This takes time and a lot of work on the part of one or more members of the program staff. To maintain that relationship, the graduates who are placed must be qualified. A lot of time and effort would be lost if the programs were to place unqualified students with an employer with whom they had cultivated a relationship.

Academic Career Focus

In the Program Administrator Survey, respondents were asked if their program was (1) college preparatory, (2) college preparatory with an emphasis on a career in a specified field, or (3) career preparatory. One-quarter said they were college preparatory, one-fifth said they were career preparatory, and slightly over one-half said they were both. They were then asked whether their program prepared students to work in a particular career field, and whether their program provided graduates with a special employment certificate or license. The answers to these three questions were combined to create a Career-Focus Scale. It was found that students in academic career-focused programs took their examinations later in their high school career than other students in our data set. For students who were reading on grade level in seventh grade, this scale correlated at .305 ($p = .080$) with taking the Regular Math Exam in 1990 and at .375 ($p = .029$) with taking the Regular Reading Exam in 1992. In 1991, the scale of academic career focus had a negative correlation with taking the Verbal SAT

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[5] This finding corresponds with that in Crain (1984) that unlike the situation for college graduates, employers of high school graduates ignore school grades. As a result, students not expecting to matriculate to college are not motivated to exert the effort required to achieve grades higher than those required for graduation. See Rosenbaum and Nelson (1994) and Rosenbaum and Roy (1996).

($r = -.303$, $p = .082$) as well as a negative correlation with our level-of-test variable, indicating that students in programs ranked high on academic career focus tended to take a lower-level standardized reading examination.

In terms of standardized math examinations, average students in programs ranked high in academic career focus again tended not to take the Math SAT Exam. In 1991, the correlation between taking the Math SAT Exam and academic career focus was negative, though not significant. In 1992, the correlation for these same two variables was -.290 ($p = .096$). This tendency towards achieving only the minimum requirements for graduation should not be taken as an indication of low student motivation, however. As with job placement services provided, we found a correlation of .289 ($p = .097$) between our Career Focus Scale and the proportion of students present for reading examinations in 1992.

While it is true that students must pass both of these examinations to graduate, and we would expect this cohort of students to graduate in 1992, it is also true that both regular examinations are the minimum required for graduation. Both can be substituted for by taking, and passing, a corresponding advanced examination. Taking advanced examinations means going beyond the minimum for graduation and might be viewed as testing one's preparation for going on to college or at least attempting to maintain the option of going to college. Students in programs characterized by a high academic career focus tend to take only the minimum required examinations and not to take either SAT Exam, an indication that these programs are focusing students on employment after graduation at the expense of college.

Previous Work Experience of Faculty

Fifty-one of the 61 administrators responding to our Program Administrator Survey reported that at least some of the teachers in their program had worked in the field for which they were preparing students. Twenty-five programs reported that most of their instructors had such work experience. The two independent variables, Career Focus and Number of Faculty with Previous Work Experience, are significantly correlated at .47 ($p < .01$). For students who were reading on grade level in seventh grade, Faculty with Previous Work Experience was found to correlate with fewer students taking the Math SAT or the Verbal SAT Exams in 1992. The aggregate file correlations were -.344 ($p = .047$) for Math and -.300 ($p = .077$) for Reading. Table 3.6 is a summary of eight individual-level differences, similar to Tables 3.1 through 3.3, but reports only the best estimates, "D" (defined in the discussion of Table 3.1 earlier) of the effect of attending a program in which more faculty have work experience. This table shows that, from the individual student file, increasingly fewer students in programs ranked high on our scale of Faculty with Previous Work Experience were taking either the Advanced Math or Math SAT

Exams. Instead, the students in these programs were more likely to take the Advanced Reading Exam in 1991 and 1992 instead. By postponing the advanced examinations until their last two years of high school, and not taking the SATs, they seem to be indicating that they will not apply to any even moderately selective four-year colleges. As already stated, however, it is only the failure to take SAT Exams in 1992 that was significant on the aggregate file.

Table 3.6. Difference in Proportion of Students Taking Advanced and SAT Exams in Programs with High and Low Numbers of Faculty with Previous Work Experience (Percent more likely to take examinations if they get into career magnets with more experienced faculty minus percent for career magnets with fewer experienced faculty)

Type and Year of Examination	*Math*	*Reading*
1991 Advanced Exam	-3%	+1%
(Sig. of 2-way interactions)	(.265)	-(.070)
1991 SAT Exam	-2%	-1%
(Sig. of 2-way interactions)	(.066)	(.160)
1992 Advanced Exam	-3%	+6%
(Sig. of 2-way interactions)	(.025)	(.056)
1992 SAT Exam	-7%	-4%
(Sig. of 2-way interactions)	(.000)*	(.001)**

* Aggregate file correlation -.344 (p = .047)
** Aggregate file correlation -.307 (p = .077)

Academic career magnet programs that are more strongly oriented towards a career than is the average for this sample of programs seem to have a definite negative influence on the development of student plans for going on to college. These findings would seem to correspond to and support those found under the section "Career Focus," namely that programs that direct students' attention out of the school towards a career will emphasize minimum graduation requirements. Advanced Exams, and to a greater extent SAT Exams, emphasize schooling and at least the possibility of going on to college. In the dichotomy between purely academic and purely vocational high school programs, clearly those with a high academic career focus, with a high proportion of teachers having had previous work experience in the field for which they are preparing students, are going to be more like the vocational model than the academic.

School Activities

The Program Administrator Survey included a number of items that seem to fall in an intermediate zone between bringing the workplace into

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the school and bringing the school into the workplace. These were classified as career-related extracurricular activities and included trips to work sites, mentors, outside lecturers, career-related clubs, and workshops on résumé writing and/or interview skills. While these variables correlated among themselves, the only other variable from the Program Administrator Survey with which they correlated was the Job Placement Services variable. When included as independent variables on the aggregate file, there were no significant correlations between these career-related extracurricular variables and student academic outcomes.

The reason for this may be that so few students actively participate in any of these activities that at the aggregate level their effect, if any, cannot be detected. McNeil (1995) analyzed the "High School and Beyond" data set and found no effect of vocational clubs on graduation rate once ethnicity, gender, age, SES, one-parent household, test scores, and academic and vocational technical placement were controlled. His analysis was at the individual level, looking just at those students who acknowledged having participated in such clubs. We are unable to distinguish between students who have and have not participated in career-related extracurricular activities with our data.

Internships

Internships and part-time work assignments provide an opportunity for "real-world" experience, building a bridge between school and work. Moreover, they provide students with the opportunity to explore and test themselves in their chosen field while they still have time to alter their educational and career plans.

Five out of every six program administrators responding to our survey indicated that at least some of their students do some sort of internship. They indicated that internships were not used in the ninth and tenth grades as much as in the eleventh and twelfth grades. Only nine of the 61 respondents said their school had no internship program while more than one-third indicated that students were required to participate in internships. In addition, about 60% of the respondents indicated that program staff located internships for students.

Among students who were average readers in seventh grade, there was a correlation of .419 ($p = .014$) between internships and the proportion of students in attendance for standardized reading examinations in 1989 and, again, for students reading above grade level in 1990 (.472, $p = .077$). Since internships are undertaken during a student's third or fourth year of high school, the increased examination presence evidenced in this table may simply be an indication that programs stressing internships tend to push students to appear for scheduled examinations in order to complete graduation requirements on time. It may also be a motivational effect similar to what we think happens in programs with high computer usage: Students

are eager to meet requirements so they can qualify for internships. While we were unable to find any evidence among typical students that internships improve academic performance, we also found no evidence that internships lower these students' academic performance or motivation.

Among students who were reading below grade level in seventh grade, there was a significant correlation (.334, $p = .058$) between internships and Regular Math Exam scores in the students' second year of high school. For students from this reading level, this examination is not usually taken until the third or fourth year of high school. That same year, 1990, there was also a significant correlation for these students between internships and the number of credits earned (.323, $p = .048$). This again seems to indicate that students in programs stressing internships are pushed to complete graduation requirements. The following year, 1991, students from this reading level did well on their Regular Reading Exams, having an almost significant correlation between that examination and internships of .330 ($p = .052$). As would be expected, however, students from this group earned fewer credits in 1991 than similar students in programs that do not stress internships ($r = -.315$, $p = .044$).

School-to-Work as an Educational Theme

Because almost all of the academic career magnets are located within larger high schools—most of them comprehensive rather than career-oriented—it would seem that it is necessary to isolate career magnet program students from other students in the school in order to allow administrators and teachers to create a unified career-training environment. Program unity allows staff to socialize students into their career, helping them establish a career identity. This is not unlike what happens in highly selective public high schools.

Program Unity

A scale of program unity (also referred to as program isolation) was constructed from a series of questions asked of program administrators. These included whether or not program students took classes with other students in the school, whether program students had special classes that other students in the school did not take, how many special classes were taken at each grade level, and whether or not students in the program had their own counselors.

Since the number of special classes taken by students in career magnet programs increases with grade level, students probably need to complete many of their graduation requirements early. We found no evidence that they were passing their comprehensive examinations early, however; there was no interpretable pattern of significant correlations between program unity and any dependent variables.

Discussion and Conclusions

The Role of Computers

The improvement in math scores in programs with a high level of computer usage is encouraging. Providing computers is a feasible strategy for improving schools, and data from this study suggest that doing so would improve test scores and student motivation. We do not know whether it is necessary to tie computer work to a particular academic career focus. It may be that computers used in a recreational way or as an end in themselves may have the desired impact on math scores; or it may be that an academic career focus is necessary to motivate students to approach the computer with a positive attitude.

One reason the computer seems to be so universally effective is that it uses a straightforward pedagogy—individualized instruction, moving at a pace appropriate to the student, and providing almost instantaneous feedback and rewards—that makes it a powerful teaching tool. It is easy to understand why students would be motivated by spending time doing any of a variety of tasks with the computer. One school we visited talked about using computers as a remedial technique to help students who had difficulty learning accounting from the textbook. Students needing additional help were given a class in computer-based accounting that succeeded in bringing students up to the level they needed for more advanced accounting classes.

We do not think that the improvement of math performance in those career magnet schools with a large amount of computer usage is a direct effect of teaching mathematics via computer. In visiting schools, we concluded that the computers were more often used in career-related classes, such as accounting, to teach secretarial or programming skills. There may be some transference cognitively from computer programming to the algebra that appears on standardized tests, but it is more likely that the transference, if it occurs at all, is in the level of symbol use. The use of icons and keystrokes to represent operations and the process of locating or moving numbers and text according to rules may make mathematical operations seem more familiar and easier to learn.

Our data supports the hypothesis that computers provide a large motivational boost. Students who can master computers may be more confident about their abilities to deal with mathematics. It may also be that simply the pleasure of working with computers makes the drudgery of a regular academic class lighter. It is possible that gaining computer knowledge gives students self-confidence about their postgraduate success, increases their confidence about their ability to get a good job or succeed in college, and persuades them that mathematics has more relevance than they thought for the work they will do after graduation. It is impossible, with the data file we are using, to empirically test these hypotheses, although

they are generally supported by the opinions of the school staff members we have interviewed.

Job Placement Programs

The creation of a job placement program has not been shown to have beneficial consequences for the academic performance of students. After visiting a number of schools, we asked ourselves whether we would expect the acquisition of computers for student use or whether the development of a job placement program would in themselves tend to encourage the faculty and administrators from the school to either (1) place greater emphasis on the quality of their teaching, (2) place greater emphasis on high test performance, (3) enhance their college placement activities, (4) make greater efforts to socialize students for adulthood, or (5) develop a dropout prevention program. We also asked ourselves whether we would expect either the extensive opportunities to use computers or the existence of a job creation program to motivate students so that they would be more responsive to the academic teaching in the school, more motivated to score well on tests, more responsive to a socialization and interpersonal skills program, more receptive to an anti-dropout message, or more motivated to seek help in going to college. No empirical study has ever been done to address the questions we were raising about the impact of one element of a high school program on its other elements; however, after reviewing the information gathered from our visits to schools, we are left with the conclusion that there was little about the development of a job creation program that would encourage either the students, the teachers, or the administration to put more energy into its academic efforts. Thus, it seems that there is little in the culture of a program focused on employment directly after high school which would lead either the students or the staff to press for higher levels of academic achievement.

It is an oversimplification to say that mathematics performance is lower in schools that stress placing students in positions after high school because career education and academics are in competition. Exactly how do they compete? One possibility is that students are not encouraged to take advanced mathematics because of the need to offer them career education courses. Another possibility is that the program administration may be indifferent to the mathematics performance of their students so that mathematics teachers are not motivated to push their students harder. Passing the Regular Math Exam is required for graduation, but in high schools accustomed to high graduation rates, the mathematics department may not be under pressure to try to get every student to pass the examination. We also hypothesize that programs focused on placing students in employment will tend to be highly selective, looking only for those students who can bring credit to the program, and hoping, either consciously or unconsciously, that other students will leave the program.

In some programs, only a minority of students are permitted to stay in the program; the others are sent into the comprehensive high school where the program is located or forced to transfer to the high school in their home neighborhood. In addition, since the program is imbedded in a larger school, there is no reporting requirement that the program be informed about the performance of its students overall. Thus, the schools have little incentive and little information to motivate students to improve their mathematics performance.

Implications for Schools

We think there are several ways that educational policy can be altered so that a strong job placement program in high school will not lead to lowered academic performance. The first step is to make sure that an accounting system is available to report back to the schools the performance of their students adjusted for their previous performance—a measure of the "value added" by the high school. We have found that these career magnet programs are not doing very well academically, but this is not at all visible, since only their average test scores and graduation rates are now reported. These, in turn, are kept high because they handpick one-half of their student body. (This is partly offset by the requirement that most of the students they select must be from average and low reading levels.) It seems unlikely that very many of the career magnets are of lower quality than the comprehensive schools. We suspect that for many of them, their scores are low because neither they nor anyone else knows that they are low. Simply publicizing the fact that many career magnets are performing below average would have a near-immediate effect on their scores. While our data are only from one geographical area, the problem of career magnet schools resting on their laurels because no one knows whether or not they are doing a good job is probably common nationwide.

Most school districts do not have an accounting system to detect the sorts of successes and failures we have uncovered. Most public school systems normally measure the performance of a school by looking at a single set of test scores, with no consideration of the education the student received in elementary or middle school or in the home. Typically, a high school can have only moderate effects on things like reading, yet many high schools get blamed for their low student reading scores, while others are praised unjustifiably for having the good luck to have well-prepared students entering their doors. Keeping track of the educational, ethnic, and socioeconomic background of students is especially important in a career magnet school, since its reading and math scores will be much more affected by its admission policy than by any pedagogical or curriculum choice it could make. The procedure we have used to compute a student's performance on a high school test net of what we would expect from their overall school scores is not very complicated; statisticians have been doing

this sort of work for over half a century, and the capability is in the hands of every school district to produce these statistics. This is a politically sensitive issue; affluent school districts have little to gain and much to lose by measuring the "value added" by their high schools, while schools serving low income communities can only benefit, since they are being unfairly punished by the present system that gives them little chance to demonstrate any success.

Providing accountability is only the first step. It is important to provide technical assistance and financing to programs so that they can attack the problem of maintaining high test scores while also running a strong job preparation mission. The schools in this study receive no special funding and no opportunity to experiment with new techniques to bridge the career-academic gap built into their mission. The amount of resources needed to do this may not be great. Career-preparatory high schools must realize that the majority of their graduates are going to go on to college. They are preparing students to hold jobs that will be used to pay college tuition. As more and more schools realize the implications of this, they will be more likely to want to provide their academic departments with the support and supervision that they need. It is also important that these schools be fairly compared to others so that any success they have in pushing their test scores up will be fairly recognized. Alternately, it may be that more high schools will decide that their only hope for providing both an academic and job preparatory education is to form partnerships with community colleges and lengthen the number of years of study. We cannot say with these data that the goal of meeting academic college requirements and preparing people for a specific skilled employment requires more than four years of high school. We can say that there is not much evidence that high schools operating without additional financial support are able to do this within the typical four-year time frame.

The results of our study are complex and surprising. Experience suggests that academic career magnet programs will become increasingly common in the United States, and it is reassuring that this can be done without necessarily conflicting with the academic goals of the school. A properly designed academic career-focused program can prepare students for college more successfully than the typical comprehensive high school. In particular, our data show that a strong academic career focus can in some cases enhance the performance of students with low reading scores. In some cases, however, there are genuine conflicts between academic and career education; programs aimed at immediate job placement after high school may lower academic performance.

We have not found a way to settle the argument about the proper balance between the academic and career aspects of high school education. Proponents of school-to-work will be heartened to learn that some components of academic-career integration have positive academic

performance outcomes, and few have negative outcomes. Most academic career magnets do not show higher mathematics and reading performance, however. The mere fact that they do not lower performance will not be enough to satisfy some of the critics of school-to-work who believe that academic performance must be increased and that anything that does not help improve scores is a distraction from the main purpose of the school. Unfortunately, that issue is not magically resolved by these findings.

Implications for Further Research

These 49 experiments provide evidence that in many cases an academic career focus can help improve the academic performance of high schools and, in other circumstances, can interfere with academics. What we have called "bringing the workplace into the school" can of course be done without an academic career focus—the heavy use of computers and independent and team projects is frequently proposed by advocates of school reform. Perhaps the most important point to make is that the academic career focus makes it easier for the school that wishes to restructure to do so since the restructuring becomes a natural part of developing the career.

We can also ask many questions about what it is about computers that lead to the enhancement of mathematics performance. The gains reported here are large—a gain on the Advanced Math Exam of one-third of a standard deviation (33 points on the math SAT), despite a 50% increase in the number of students taking the tests, is impressive. The improvement in attendance on the standardized examinations suggests that part of the impact of computers is motivational rather than strictly cognitive. What is their motivational value? Is it because they are linked to future occupations? Are students motivated by having control of a process, rather than being passive followers of instruction, or because of the physical nature of keyboarding and mouse-pushing? Are the computers a status symbol for students? If the computers have a more direct cognitive effect as well, is this because computers are used directly to reinforce mathematics lessons? Is there some sort of transference, perhaps because students are learning the step-by-step structure of computer programming and transferring that skill to mathematics problems? Are computers being used to handle numbers (as in accounting) or symbols (as in abstract programming) which make students more comfortable with either number-based mathematics or with algebra? Is computer work helping students lengthen their attention span? Is it because the physical movement of keyboarding reaches students whose intelligence is more kinesthetic? All these questions require more research, including more attention to how students use computers.

There is seemingly strong evidence that programs that take students out into the workplace and prepare them for jobs immediately after graduation may have negative effects on student academic performance.

Several other measures of employment focus, such as having vocational clubs, inviting guest speakers from industry, or using mentors, show neither positive nor negative cognitive effects in these data. There are strong noncognitive benefits attached to internship programs and mentoring, but no impact, positive or negative, on test scores. But one aspect of a "taking the school to the workplace program"—a commitment to placing students in employment after graduation—seems to lead to a de-emphasis upon academic performance. This may be the direct result of a competition for the student's time. In order to reach the level of performance required of an employer, the school must invest more time in training to meet those performance standards and, in some cases, this may lead to a sacrifice in academics.

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CHAPTER 4

The Design of Career Magnet Programs and Students' Experience of High School

Debora Sullivan and Judith Warren Little

Programs built on a model of integrated academic and vocational preparation have multiplied steadily following the 1990 amendments to the Perkins Act and the 1994 School to Work Opportunities Act. In crucial respects, these programs parallel other efforts to reform American secondary education, responding especially to the problems of curriculum fragmentation, "passive" pedagogy, student disengagement, and the anonymity spawned by the large comprehensive high school (Kemple & Rock, 1996; Olson, 1997).

Encouraged by evidence gleaned from various discrete programs such as career academies, school-based enterprises, partnerships with community colleges or local employers, advocates of a "new vocationalism" emphasize the philosophical and programmatic resources they bring to a wholesale reinvention of the high school (Olson, 1997; Stern, Raby, & Dayton, 1992). The prospects for such a convergence rest in part on persuading educators, parents, the wider public, and the students themselves that there is something to be gained by "scaling up" these small models, and by making the connection between school and work a more central feature of secondary education. Yet, through the act of "scaling up," we run the risk that it will be assumed that structural similarities will ensure comparability of student experience.

Few studies of restructuring schools do much to investigate student experience in any depth. In this paper, we make such an attempt, albeit in retrospect. In reconstructing the experiences of 14 low- to middle-achieving graduates of career magnet programs, this study speaks especially to two converging strands of reforms in secondary education: "personalization" of student experience, and closer integration of academic and vocational aims.*

Three career magnet schools account for the 11 *career magnet school* cases. Two of the schools offer a range of programs related to a single career theme (i.e., Health Careers magnet and Business magnet). Four career magnet

* For graduates' gender and race, and their parents' education and occupation, see Appendix 1 (this chapter).

school cases are derived from each of these two "single theme" schools. The third school is organized around programs in various occupational areas, including aviation, computer technology, law studies, and communications. Three career magnet school cases come from this "mixed-theme" school. (Earlier in this report, this school is referred to as the Engineering magnet.)

Three comprehensive schools with career programs (school-within-a-school models) account for the three *comprehensive career magnet* cases. Two cases come from Business Careers programs, and the third from a Health Careers program. The three students were lottery losers, who were able to get into a career magnet program in their neighborhood comprehensive high school.

The "Magnet Advantage"

In principle, career magnet schools and programs present a systematic alternative to the prevailing conditions of large scale, curricular fragmentation; passive pedagogy; student anonymity; and institutional neutrality regarding student effort and performance. They organize students in small cohorts that remain together through a sequence of courses over a two- to four-year period (Olson, 1997; Stern et al., 1992). The schools or programs embrace a "dual mission" of college and career preparation, achieved in part via explicit curricular connections between occupational and academic curricula. Teacher teams afford the possibility of more concentrated and coordinated student support. Students' academic and social progress can be collectively monitored as teachers share knowledge they have acquired about students' academic aptitudes and needs, as well as their personal goals and interests (Elmore, Peterson, & McCarthey, 1996; Meier, 1995; Stern et al., 1992). The information teachers gain over time about students' aptitudes, goals, and interests also positions them to offer meaningful advice and assistance regarding future careers and educational goals and to create appropriate instrumental support for academic success (McCharen, 1995; Newmann, 1981).

Based on a review of the literature in this area, we theorized that career magnet schools would differ from traditional comprehensive high schools by altering the organizational conditions associated with student engagement and success. Career magnets were thought to provide greater personal and academic supports for student achievement. We hypothesized that a small student cohort and consistent teacher team would enable more "personalized" social and affective relationships between students and teachers that would prove conducive to student effort and achievement. We expected that students' level of success and engagement in school would be heightened by the presence of one or more school-based adults who knew the student well; who demonstrated care and interest; and who were

structurally positioned to provide academic assistance, personal support, and college and career guidance.

We also reasoned that career magnets would stimulate student commitment to schooling through their dual mission of career and college preparation. Prior interviews with school administrators responsible for the career magnet programs led us to expect students of those programs to have experienced curriculum integration in two ways: via connections between academic and occupational coursework within school, and through well-structured links between coursework and work-based learning outside school. We hypothesized that the combination of curricular focus and integration, active pedagogy, and structured work-based learning experiences would engage student interest, stimulate a "planful" orientation toward the future, and result in a connection between graduates' early career or educational trajectories and their high school career magnet program.

To evaluate the high school experiences and postsecondary outcomes of our 14 career magnet graduates, we specified these broad assumptions as a set of seven criteria presented below as the *Magnet Model*.

The Magnet Model

- *Program definition:* A structured program of classes and related activities focused around a clearly discernible occupational field (e.g., health, business, or law) or around a specific occupation (e.g., nursing, secretarial studies, or computer technology).
- *Personalization:* Close student/adult relationships. Program adults know students well and communicate care and interest in them. Meaningful career and college guidance provided, based on adults' knowledge of students' needs and goals.
- *Curriculum focus:* Coherent sequence of classes leading to a body of knowledge/set of skills in a given occupational area.
- *Curriculum integration:* Emphases on connections between academic and occupational classes, and connections between school curriculum and students' experience in school-connected work placements or internships.
- *Active pedagogy:* Hands-on experience in occupational labs or classes. "Real life" experiences in program-connected work placements, project-based pedagogy, student-initiated work, and cooperative assignments.
- *Program design in support of student success:* Teacher teams sharing responsibility for student cohorts; structure for monitoring academic performance.
- *Career/college guidance:* Mechanisms for informing and advising students about postsecondary options related to program's occupational focus.

To the degree that students experienced these features of a Magnet Model, we anticipated that they would demonstrate the following:

- *Engagement:* High level of interest in school and schoolwork based on stated interest in the occupational focus area and affiliation with the program. A view that curriculum is relevant to outside world and to future endeavors.
- *An instrumental view of school:* A seriousness of purpose with regard to schoolwork and a planful orientation toward the future during high school. A retrospective view of high school as instrumental to post-graduation status.
- *Postsecondary outcomes associated with program focus:* Trajectory of experiences evident two years after graduation which reveal continued connection with program's occupational focus.

Using this conceptual framework as a guide, we set out to investigate the high school experiences of our 14 career program graduates. We found that not all magnets attract.[7]

Discovering Cases of "Good" and "Poor" Fit with the Magnet Model

Two years after graduating, 14 career magnet program graduates spoke to interviewers at length about their high school experiences, their present circumstances, and their plans for the future. Reading the lengthy interview transcripts, it became quickly apparent that the high school experiences of the 14 graduates varied in two principal ways: (1) with regard to their reported ties to a structured, academic career-focused program; and (2) in the locus of influential relationships they established with teachers or other adults in school. By these initial criteria, six of the cases promised a "good fit" with the model (Table 4.1a, Cases G1 through G6) and eight indicated a "poor fit" (Table 4.1b, Cases P1 through P8).

Program Ties

Program ties signify both the graduates' access to a structured career magnet program and their expressed investment in the program to which they were assigned. In all six good-fit cases, the graduates enjoyed structured programs with salient occupational themes. They were able to articulate ways in which aspects of their program differed from, or stood out against, other programs in the school. They described (and academic transcripts confirmed) a coherent sequence of program coursework (Appendix 2, at the end of this chapter). All six completed program-connected internships or co-op work experiences, and four described other

[7] It is important to emphasize that the model is not a tool for evaluating the programs in this study. Rather, it helps us understand the experiences of these 14 graduates of career magnet programs.

features such as program clubs, field trips, or conferences in which they participated. Two of the six good-fit graduates developed strong attachments to their programs, but did so after initial difficulties in high school. One student successfully sought a change from an accounting program to the clerical procedures program when his interest in accounting waned. His performance and attendance both improved following the switch, so much so that he was recognized with an award for the "most improved" student in the program. Another student was "on probation" when accepted into the nursing program in tenth grade. She said it was not until eleventh grade that the program was what she "actually wanted for myself" (rather than to please her mother). During the eleventh grade, she began to recognize that the program afforded her "the opportunity to do something when I got out of school." Like the other five good-fit cases, she looked back on her program favorably, noting that, "The most important thing about my high school was the program."

Poor-fit cases reported far more tenuous connections with their career magnet programs, and looked back with a more critical eye. All but one of the poor-fit cases reported program ties that were weak or non-existent. In five cases, there is some indication from graduate and adult interviews that the program itself was weakly designed; in the remaining three cases, a variety of circumstances made it difficult for students to derive much benefit from more well-defined programs. In two cases, we are unable to detect in the student's record any pattern of course-taking consistent with the career magnet assignment. In three other cases, the career magnet assignment is evident in transcripts but was described by graduates as a mismatch with their interests and talents ("I didn't like accounting. . . . I knew that accounting wasn't really for me," P7).

Locus of Influential Relationships

In our initial conception of career magnet programs, we anticipated that students' most meaningful and influential relationships with adults would arise through participation in the program and would entail a range of supports for achievement in school and work. When asked to nominate adults who had been influential to them during their high school years, we expected program graduates to identify teachers or counselors directly connected to their programs and to point to multiple connections (several adults) within their programs, signifying a certain "density" of support. Further, we expected to find evidence that the graduate and nominated adults knew each other well—that their stories would match, and match in a way that indicated that the relationship and the program supplied both personal and academic support.

When asked to identify the one adult who had been most important and influential for them in high school, each of the graduates in the good-fit cases named teachers in the programs to which they were assigned. Furthermore, three of the graduates identified two or three program teachers

or program counselors as influential, and three graduates said that the program teachers in general were important to them during their high school years. These graduates portrayed strong relationships with adults who knew them well by virtue of a program context—that is, they tended to experience these relationships not as idiosyncratic ties between an individual student and a particular teacher, but as part of a pattern of teacher-student interaction characteristic of a program. Thus, a graduate of the secretarial studies program (G2) recalled that program teachers, "make the students united . . . and they really show that extra caring." Similarly, a graduate of a health careers program (G5) said program teachers were "available if we needed any help . . . or if we wanted to talk to any of them" about personal issues. She continued, "They knew what you were striving for, and they tried to help you."

By contrast, the poor-fit graduates did not look to their career magnet programs as the source of their most significant adult contacts and were less likely to single out teachers as having been influential. These graduates found it more difficult to name adults who had been influential for them, with whom they had talked outside of class, or who knew them well. Only two poor-fit graduates nominated teachers as influential, but they were not teachers connected with their career magnet program. Two graduates (P4, P7) established a connection with adults in administrative or extracurricular roles who exhibited a personal interest without specifically influencing the students' academic progress or performance, or their career plans or preparation. Thus, Case P4 recalled a dean as someone who shared his interest in basketball, but who also helped him cut classes. Case P7 found her basketball coach to be someone who recognized and rewarded her athletic talents, who was easy to talk to, and who told her about the possibility of athletic scholarships. She did not expect that her accounting program teachers would know her well—indeed, that they would even know her name. Four of the poor-fit relationships resulted from special efforts made by an individual teacher or counselor to push a student through to graduation in the face of persistent failure. Only one poor-fit graduate (P1) named a sizable constellation of adults outside her program from whom she derived steady support over four years: a voluntary student counseling program coordinator, who provided the graduate with leadership and peer counseling opportunities; and academic teachers who constantly "pushed her" and "opened doors." By contrast, she described her law studies program teachers as inconsequential. To derive more support from them, she speculated that she would have had to take the initiative: "I didn't think they were very [supportive] . . . but I, maybe I didn't give them a chance. Maybe I didn't knock on their door and sit down with them and talk to them. I didn't." In the remaining cases, we find relationships that center on some specific aspect of student interest (e.g., basketball), are weakly linked to the student's program of study, and/or have little bearing on the student's preparation for college or career.

One measure of the intensity of the relationship between the graduates and the adults they identified as influential was the degree to which the retrospective accounts they gave of the relationship matched. In all six good-fit cases, we find stories that match. In four of the cases (G3, G4, G5 and G6), the nominated adults remember the graduates vividly and describe strong personal and academic relationships with them while they were students. The graduates echo these accounts. For instance, a graduate of a clerical procedures program (G3) said that the adult he nominated "constantly reminded" him he had to do well in school and made him feel "important, exceptional." The adult in this case speaks proudly of the academic turnaround this student made when he entered the program. She describes ongoing academic encouragement, culminating in an award for "most improved" student in the program. Adults in the other two cases (G1 and G2) speak in terms of their relationship with the graduates' cohort rather than with the graduates specifically. Nonetheless, adults and graduates in these cases used strikingly similar terms when describing their relationships. Thus, a teacher in a nursing program (G1) recalls the graduate as one of "the group (who) could come to me with anything." The graduate confirmed this account saying that this teacher developed personal relationships with all program students, "so she seemed more tough being that she took it on a personal level."

With one significant exception, the adults nominated by the poor-fit cases all recall the graduates, but they do so with varying degrees of clarity. At one extreme, we find a graduate of a computer technology program (P3) who singles out a social studies teacher as the most "caring" of his instructors. Although his transcript shows that he took three courses with her, the teacher confesses to having no memory at all of the student. At the other extreme, we have a law studies program graduate (P1) and her counseling program advisor who both speak of almost daily contact arising from student leadership and peer counseling activities. They both describe a "social and personal" relationship which included frequent discussions about college preparation. Between the poles we find three cases (P5, P7, P8) in which the adult interviews portray relationships in ways that closely parallel the graduates' accounts; one case (P6) in which the adult and graduate knew each other only briefly and superficially during twelfth grade; and two cases (P2, P4) in which the adults' accounts differ wholly or substantially from the graduates.' In the latter two cases, the adults portrayed the graduates as more academically successful and the relationships as more significant than the graduates' academic records or interviews would indicate.

After our initial designation of the cases as good or poor fit based on program definition and personalization, we turned to an investigation of the curricular aspects of the model, to see if the two groups were differentiated by these criteria as well.

Table 4.1a
Identification of Good-Fit Cases

Criterion of "Fit" with Magnet Model	Case G1 Magnet School (Health - LPN)	Case G2 Magnet School (Secretarial Studies)	Case G3 Magnet School (Clerical Procedures)	Case G4 Comprehensive School (Travel and Tourism)	Case G5 Comprehensive School (Health Careers)	Case G6 Comprehensive School (Accounting)
Program Ties	Moderate to strong attachment to highly structured program	Strong attachment to highly structured program	Strong attachment to structured program	Strong attachment to highly structured program	Strong attachment to structured program	Strong attachment to structured program
Student Interest	Low initial interest in program, strong attachment by the end. Stopped cutting and changed peers when accepted into program in 10th grade: "The most important thing about my high school was the program."	Attributes positive high school experience to the program. Helped clarify career goals and taught skills: "It helped me know that I want to go into business."	Attributes academic turnaround to program. Stopped chronic cutting when he joined program in 11th grade. Received academic award during 12th. Program made him feel "exceptional, important."	Applied to the two-year program during 10th grade. Active in program conferences; served as program president in 12th grade; and reviewed applications from younger students.	Applied to the program when she entered the school: "From the start I wanted to be in Health Careers (and) the teachers inspired you to stick with it."	Chose the program when she entered the school. Participated in program related conferences. Without the program, "I wouldn't know anything . . . I would have to go through a training school."
Program Structure	Sequence of classes; supervised clinical internships; field trips; nursing club	Sequence of classes; related co-op work experience required	Sequence of classes; related co-op work experience or internship required	Sequence of classes; internships; conferences; field trips	Sequence of classes; internships; field trips	Sequence of classes; internships; conferences
Influential Adult	Nursing teacher	Secretarial Studies teacher	Clerical Procedures teacher	Travel and Tourism teacher	Nursing teacher	Accounting teacher

Table 4.1b
Identification of Poor-Fit Cases

Criterion of "Fit" with Magnet Model	Case P1 Magnet School Law Studies	Case P2 Magnet School Law Studies	Case P3 Magnet School Computer Tech.	Case P4 Magnet School Dental Tech.	Case P5 Magnet School Medical Business	Case P6 Magnet School Medical Business	Case P7 Magnet School Business Acct.	Case P8 Magnet School Computer Tech.
Program Ties	Weak attachment to minimally structured program	Weak attachment to minimally structured program	No attachment to apparently non-existent program	Weak attachment to structured program	Moderate attachment to program joined in 12th grade	Weak attachment to program joined in 12th grade	Weak attachment to structured program	Weak attachment to structured program
Student Interest	Strong interest in field, but program classes seen as unrelated to legal profession. Interest in law sparked by English teacher who made her reason and analyze	Low interest in field. Program classes seen as unrelated to legal profession	Strong interest in field stimulated by parent's occupation and by pre-high school summer program	Low interest in field. Chose school for social reasons	Interested in program. Saw it as opportunity to graduate after 5th year	Three changes in program recorded over three years. Interest in medical business attributed to co-op work opportunity	No interest in program or field. Chose it based on friendship and past success in math	Some interest in field. Student says program courses served him well
Program Structure	Sequence of classes labeled law studies but they were seen as just social studies; mock trial experience in one class	Sequence of classes labeled "law studies" but no access to mock trial due to poor academic record	No sequence apparent on transcript; one keyboard class	Sequence of classes; on-site dental lab	Entered late, so no sequence evident on transcript (and we are not able to assess program course structure)	Entered late, so no sequence evident on transcript (and we are not able to assess program course structure)	Sequence of classes completed over four years	Sequence of classes
Influential Adult	Student counseling program coordinator	Guidance counselor	Social Studies teacher (non-program)	Dean	English teacher (non-program)	Work co-op coordinator	Coach	Guidance counselor

Curriculum and Pedagogy

To what extent does the distinction between the good-fit and poor-fit cases have its roots in programmatic differences, that is, in the degree of program definition supplied by the curriculum? In keeping with our model, we expected the graduates to be able to articulate the meaning of "program focus" and to recall a course-taking pattern consistent with their program's occupational area. Further, the curriculum integration component of our model posited explicit links between academic and occupational coursework and between coursework and student experiences in the workplace. Finally, in keeping with reformers' calls for an "active pedagogy" in career magnet programs, we expected to hear about program coursework emphasizing "hands-on" learning, and program-related work experience providing opportunities for "learning by doing."

Graduate interviews, adult interviews, and academic transcripts confirm that the good-fit graduates generally experienced a coherent occupational program including a required workplace component. The poor-fit graduates, while looking very different from their good-fit counterparts as a group, presented more internal variation in terms of their courses of study, although none of the eight was required to complete a program-related internship or co-op work placement. Some distinctions between good- and poor-fit cases are further clarified and reinforced by an examination of the curriculum and pedagogy they experienced in program classes. At the same time, the two groups are similar in one respect—neither experienced the range of curriculum integration widely advocated by the new vocational reforms. Table 4.2 summarizes the good-fit and poor-fit cases with regard to four aspects of program definition: (1) curriculum focus, (2) curriculum integration, (3) active pedagogy, and (4) structured work learning experience.

Curriculum Focus

With a couple of poor-fit exceptions, the academic transcripts for both groups reveal similarly strong sequences of program-related classes; however, the ways in which the good-fit and poor-fit graduates perceived and experienced their program classes differ tremendously. Good-fit graduates spoke clearly about the specialized curriculum and a sequence of related coursework in their programs. Thus, Case G2 reported that, "All of our classes were geared toward business . . . (after typing) they moved us to stenography and computers. Then . . . our Word Perfect class. And we had a DBase class . . . then an office procedures class. . . ." A health careers graduate (G5) said that during ninth grade, they learned about résumés, job finding skills, how to fill out college papers, and "stuff like that." Tenth grade courses focused on medical terminology and types of medical treatments. In eleventh grade, they took "bio-med," which involved "lab

work . . . blood tests . . . dissection." Then, in twelfth grade, they participated in a yearlong internship in a local hospital. A graduate of an accounting program (G6) recalled that during ninth grade, "they prepared us for the business world . . . how to dress . . . how to type my own résumé and cover sheets. . . ." Later classes included "typing, computers, and word processing." By eleventh grade, "we really started getting into all aspects of business."

Academic transcripts of good-fit cases confirm clearly defined sequences of courses linked to an academic career focus. The two nursing program graduates (G1, G5) completed 11 and 15 program-related classes, respectively. (Class counts are recorded in semester equivalents. Thus, yearlong or double-period classes are counted as 2; quarter-long classes are counted as .5.) The graduates of programs specializing in clerical/secretarial procedures (G2, G3) completed 14 and 11 program-related courses, respectively. Another graduate (G4) took ten courses specifically linked to her specialization in travel and tourism during eleventh and twelfth grades. The accounting program graduate (G6) completed 12 program-related classes. (See Appendix 2, this chapter.)

Unlike the good-fit cases, poor-fit graduates were generally unable to see any meaningful focus in their curriculum or to remember a sequence of courses in which they built a recognizable body of knowledge and skills in a particular occupational area. At first glance, the inability of the poor-fit graduates to articulate a program focus is puzzling given that in six of the eight cases, academic transcripts show that the graduates were enrolled in at least eight classes related to their program's occupational field. However, interview transcripts reveal that while they were enrolled in a number of program classes, these graduates did not, for one reason or another, experience them as a coherent sequence of courses related to their program's occupational field of focus. Two of the six cases (P1, P2) were enrolled in the same law studies program and took a nearly identical schedule of classes over a three-year period, beginning with two years of "Law/Global studies" and ending with courses in constitutional and government law; however, both of these graduates described their law courses as "a lot of social studies." Case P1 was unable to recall any class specifically oriented toward career-related study or planning and observed that the one person who spoke to them about the legal profession during high school described a world that bore no resemblance to anything she experienced through her coursework. Although program classes presented little that she saw as directly related to a career in law, "It kept me in that frame of mind . . . that I'm gonna go to law school." She added,

> To tell you the truth, the class that made me want to be a lawyer was my English class. . . . Because my English class made me think. The way [the teacher] taught a class was he would let us read like

> 10-12 books. . . . [so] it was fun because . . . we had to interpret. We had to find the symbols, find the metaphors. . . . I loved that. You had to do a lot of reasoning. And it wasn't so much [like that in] my law classes or my social studies classes or my history classes 'cause that was just memory. . . . It was just a very general thing. . . . It was a lot of social studies.

While Case P2 passed only three of her eight semesters of law studies classes, and so could conceivably have missed the connection between her program and the legal profession, Case P1 appears to have been a conscientious student who performed well in both program and academic classes.

Case P8 also failed several of his program classes (and was interested "mostly in girls" during high school); nevertheless, he could describe the computer courses he took and to the extent that he saw school as relevant at all, it was in those classes. Cases P5 and P6 both switched to the same medical business program in twelfth grade, and so cannot be expected to have experienced a coherent sequence of program courses during high school. (P5 had been in an accounting program which he experienced as a series of regular math classes; P6 had bounced from one program to the next during her first three years.) It is interesting to note that both of these graduates were at risk of dropping out before being "captured" by the co-op coordinator (a medical business program teacher) in twelfth grade. Case P5 had failed 17 classes and Case P6 was thinking of dropping out, seeing little value in attaining a high school diploma. These graduates appear to have been offered co-op work placements and a spot in the medical business program as a way of "holding" them in school. Both said the co-op work and medical business program provided them with a "special" opportunity, given their lackluster performance in school.

P7 and P4 are cases in which a sequence of program classes were completed by the graduates; however, due to a complete lack of interest in their programs' foci and weak attachments to their programs in general, these graduates did not experience their coursework as a coherent program preparing them for postsecondary career options. Among the 14 cases, the academic transcript of Case P7 reveals one of the most focused sequences of program coursework. She was able to recall program classes, including accounting, business math, business law, but reported that the sequence of classes was useful mostly in showing her that "accounting wasn't for me." Case P7 recalled choosing her accounting program, not because she had any interest in the field (indeed she "didn't really know what accounting was"), but because she thought it had "something to do with math," which she was "good at." She performed fairly well in her program classes, but never warmed up to the idea of a career in accounting.

Case P4 confessed that he chose his high school because it was known to attract "lots of girls" for its nursing programs. He chose the dental tech program over nursing or medical business but never felt connected to his program or expected to continue in the dental field. Cases P7 and P4 both confessed that their abiding interest in high school was basketball. Both nominated influential adults who were directly (P7's coach) or indirectly (a dean who shared P4's enthusiasm for basketball and attended his games) connected to their sports programs.

In the remaining two cases (P3, P6), we are unable to detect in the graduates' records any pattern of course-taking consistent with their career magnet program assignments. In the more extreme of the two instances (P3), the student, enrolled in a computer technology program, described futile efforts to secure any computer class beyond basic keyboarding. His transcript confirms that over a four-year period, he took one course in keyboarding but no other computer-related courses. His explanation for this difficulty centered on the weakness of the program itself. He cited differences in the relative political and material strength of programs—other career magnet programs received attention and resources that the computer program apparently did not: "They get field trips [and] equipment." Access to the "interesting" components of a career program may in some instances have been reserved for students who were doing well academically and socially. Some program administrators and counselors informed us that internships were reserved for a small number of "good" students. One graduate (P2) expressed disappointment in being closed out of electives that involved the most interesting field trips and activities because she was not "advanced" and did not "pass tests."

Curriculum Integration within School

Although good-fit and poor-fit cases differed in their access to and/or interest in a sequence of academic career-focused courses, both groups experienced a general curricular "disconnect" between academic and occupational coursework. Virtually none of these graduates recalled having encountered the kind of curriculum integration envisioned by the advocates of contemporary vocational reform. When asked, most of the graduates professed to see little or no deliberate connection between their academic and career-related courses. Nor did the teachers with whom we spoke describe an integration of academic and vocational coursework. Academic teachers tended to value the motivation shown by students in academic career-focused programs but did not see the integration of curriculum as necessary or desirable. Several of the occupational teachers in the good-fit cases agreed that links between academic and career curricula and coursework could be beneficial; however, only two of them had relationships with academic teachers that permitted even limited instances of integration.

Both nursing teachers (G1, G5) believed that the content of their classes was "naturally" linked to biology and math but, as one put it, "They have to come to us having already taken math." Neither of the two had ever talked with math or biology teachers to do "anything specifically interdisciplinary." The secretarial studies teacher (G2) described how her medical stenography class ties into genetic biology, "You have to know about the body, how it functions . . . that's part of what you learn in biology." She also noted that program students "go over taxes . . . do rates for FICA . . . learn bank checks, all of that ties to math." But when asked if she ever gets together with math or science teachers to discuss specific curriculum links, she replied, "I really, no, I never thought of it before." The clerical procedures program teacher (G3) said that sometimes what the students were doing in English or keyboarding classes might "tie into what I was doing with the students" but this was "coincidental."

The limited, and only, examples of links between academic and occupational coursework come from a travel and tourism program (G4) and from an accounting program (G6). Two of the four teachers assigned to the travel and tourism program also teach academic courses (English and social studies). As a consequence of their dual teaching assignments, and because program students take all of their courses as a cohort, curriculum integration in these two subjects is permitted; however, the occasional links described do not amount to the type of curriculum integration envisioned by reformers. One teacher contended that, "There's an English side of travel and tourism as well as . . . the geography part." So if students were studying tourism in a particular region of the world during social studies, "their English counterpart would have them read something dealing with that particular group of people or culture." The accounting program teacher (G6) said she and a math teacher got together during their common prep period "once every two or three weeks" to discuss some "very simple" linking: "If she wanted to do equations for the kids who had accounting she would be able to say 'look at this accounting equation.' Although some of the other kids may have been a little confused." The graduate in this case recalled these limited links and said she started liking math in high school "being that I had accounting and math together and saw that it mixed. It was like a turn on."

Curriculum Integration Between Coursework and Work-Based Learning

The other component of curriculum integration hypothesized in the Magnet Model was equally elusive. In only two of the 14 cases (both good-fit health programs) did we find examples of explicit connections between program coursework and practical work experience—and one of those is weak. As seniors, LPN program students (G1) took "Practical Nursing," a yearlong, half-day course in which they alternated two week periods in

the classroom ("theory") and at the hospital ("clinical rotation"). The graduate reported that "whatever we were learning in the school, we were practicing it at the job." The program teacher confirmed this account, saying that during class "we discuss those things that we will be putting into practice in the clinical area our next rotation out." By contrast, the other health careers program graduate (G5) portrayed the three afternoons each week that she spent at the hospital during her senior year as "more clerical . . . than anything else." Limited hands-on classroom activities were only vaguely connected to the hospital rotation component of the course. She explained that during class time,

> She taught us a few things but it was nothing we really needed to know. Like we learned how to do blood pressure and how to check your pulse . . . but it was not something that we ever applied in the hospital . . . because we weren't certified to do anything.

Both nursing program students recalled writing reports based on their experiences in their internships positions. However, again, the experiences of the two graduates differed markedly. Case G1 was required to write a series of five-page reports after shadowing various hospital employees. The reports focused on the person's background and on the treatment they gave a particular patient over a period of time. The graduate reported that in "every different area we went into in the hospital we had to do it." She specifically mentioned a report about an "AIDS baby" that "stands out the most." The other health program graduate (G5) described a single report that she was asked to write about someone in the hospital where she interned: "I interviewed a social worker . . . sat with him maybe a half hour, that's it . . . I thought social workers made a lot of money, but they don't . . . . [T]hat's basically what I remember from this interview, that's it."

"Active" Pedagogy

The project-based, problem-solving, learning-through-doing pedagogy thought to be associated with career magnet programs was largely absent in the graduates' recollections of high school, though more evident in the good-fit cases. The picture that emerges, particularly among the poor-fits, is one of conventional whole-class lecture instruction and textbook-based assignments.

Good-fit graduates appear to have experienced a higher frequency of active pedagogy due largely to classwork requiring the use of technology, equipment, and materials like those found in the workplace. In an LPN program (G1), for example, teachers focused classroom instruction on the "nursing process"—identifying and prioritizing patient needs, deciding on a course of action, and taking action: "Then they must evaluate to find out if it worked. If it didn't, then they have to start all over again." Applying

the "nursing process" in class often entailed the use of hospital equipment, which the graduate described as "exactly what we encountered on the job." According to the teacher interviewed in the other health careers program (G5), coursework involved frequent laboratory activity linked to course topics: "We'd go through the structure of the circulatory system, we'd dissect a heart . . . do activities like . . . taking their pulse and activities to see how the pulse is affected. We had stethoscopes; we would do EKGs." The graduate agreed that her "bio-med" course involved "lab work . . . blood tests . . . dissection . . . , working with hands-on contact." She added, "I liked it a lot that year." However, she reported that only "some" of the equipment used in program classes was like what she saw at the hospital, and that they were not allowed to touch hospital equipment anyway.

Both the secretarial studies and clerical procedures graduates (G2, G3) recalled using the same type of equipment during program classes as they encountered during their co-op job or internship. Case G2 specifically mentioned typewriters, steno machines, math computers, and a switchboard set up for classwork. The teacher confirmed frequent use of "up-to-date" equipment like the ten new computers and CD ROMs recently purchased for the program "because I feel that we have to compete with what's happening out there." The travel and tourism graduate (G4) mentioned employing computer skills and reservations software knowledge gained in program classes during her travel agency internship. Our accounting program graduate (G6) mentioned using accounting equipment and software during both accounting and computer math classes. She described group projects requiring students to create "accounting ledgers for the year" based on sets of books her teacher acquired from "actual companies."

Other good-fit graduates and adults spoke of projects and reports that required students to wrestle with "real-world" problems or to seek out information in the workplace. A secretarial studies teacher (G2) described a group project that asked students to "create their own business . . . make a presentation to the class and explain the logo, what type of business, who was the target audience . . . and give us a product." In the travel and tourism program (G4), students completed research papers on hotels and airlines as part of their investigation of career opportunities in the field. Their research frequently included field trips. For example, a visit to an airline enabled students "to see if the airline . . . fulfilled everything we talked about in class." Two other good-fit graduates reported a fairly extensive series of program-related field trips intended to allow them to observe and report on various occupations within the program's field of focus. A business program graduate (G6), for instance, said they went on "a lot of field trips . . . to get an idea of what it's like to work for an insurance company . . . (and we went) into courts for court stenographers." In one of the nursing programs (G1), students experienced a series of field trips during eleventh

grade. Two mornings each week they visited pediatric care units, day care centers, rehabilitation clinics, and nursing homes as part of their "Life Cycles" class.

To the poor-fit graduates, program coursework was hard to distinguish from school-as-usual. These graduates were hard pressed to recall classroom experiences that departed from conventional classroom practice. Asked if she had completed any projects or encountered any "real world" problem-solving in her classes, Case P2 at first maintained that she "had no assignments like that. I just had like book assignments. Do a book report." She recalled that her math class involved "adding and subtracting as you have to do it in the real world. But other than that, no." She then reconsidered:

> In one law class, we'd look in the newspaper, looking for articles, and maybe have to try to understand it as a lawyer would. To figure out what they are talking about: What this means, what is going to happen. You had to read the case. And then . . . we had this little mini courtroom. You go in there and probably try to act out. Who's the bad guy? Who's the judge, attorney, the suspect, the defendant, and stuff like that.

Other poor-fit graduates recalled only infrequent instances of "active learning"—occasional group work, a project, or a simulation. Such instances stand out only dimly in a general sea of "just classwork," and one graduate (P3) could not recall a single such event.

Structured Workplace Learning Experience

In all of the good-fit cases, graduates reported that their program required some form of program-based work experience. In contrast, while two poor-fit graduates had jobs through school co-op programs, no poor-fit graduates participated in structured work experience specifically aligned with or provided by their program.

The good-fit cases typically completed required internships, supervised practice, or program-related co-op work placements. Case G1 offered the best example: During alternating two-week periods throughout the twelfth grade, nursing program students participated in a hospital internship. Their nursing program teacher supervised the work placements and instructed students in the classroom when they were not in the hospital. The graduate reported that they got into "every area of the hospital" during that year and that they were directly responsible for patient care. By contrast, the other health program graduate (G5) described her largely unsupervised internship (three afternoons each week during twelfth grade) as "more clerical than anything else." Sometimes she was "like a candy striper. If the patients needed water, we would get them water . . . we would go down to

the cafeteria and get them their food . . . we'd go to the supply room . . . or sometimes I would help the therapist . . . like putting (a patient's) sneakers on." Two other good-fit graduates described program internships. An accounting program graduate (G6) recalled using skills she learned in her business classes and acquiring new marketing, accounting, and data entry skills during her internship at the Drama League. She stayed at the Drama League as a part-time employee after graduation until she found a full-time job. Case G4 reported that during her summer internship at the American Express travel office she "learned a lot" about computers and software specifically designed for the travel industry.

After completing the required semester of co-op work, in a clerical position with the Secret Service, the secretarial studies graduate (G2) remained on the job for an extra semester. A program teacher recommended her for the position. The graduate said the job required her to use the typing, phone, and clerical skills she had learned in her program classes. Case G3 was not assigned to a required co-op placement in the clerical procedures program because he had participated in an internship placement with a brokerage firm through the accounting program he was in prior to transferring to clerical procedures.

The poor-fit graduates appear to have inhabited a different world in which programs nominally organized around career themes were not really about work in any recognizable way. In no case was structured work experience a required element of the program for poor-fit cases. Two poor-fit cases held co-op jobs during twelfth grade when they joined the medical business program, but neither was fulfilling a program requirement. In three cases, program adults said internship opportunities were sometimes available to program students, but none of the graduates reported having participated in them.

While the Magnet Model's predictions of curriculum focus, active pedagogy, and structured work learning experiences differentiated the good- and poor-fit cases, our assumptions about curriculum integration did not. Based on the graduates' reported experience with integration of academic and vocational coursework and workplace learning, the benefits of curriculum integration remain untested. The good-fit cases appear to have enjoyed a well-defined, coherent program of work preparation balanced by, but not integrated with, standard coursework in the core academic areas. The poor-fit cases lack even this strong parallelism. Important differences remain, however, between good-fit and poor-fit cases, and these differences are in some important measure the result of differences in program design and operation.

Table 4.2
Curriculum and Pedagogy Experienced by "Good-Fit" and "Poor-Fit" Cases

Case Type	Experience of Curriculum Focus	Experience of Curriculum Integration	Experience of "Active" Pedagogy	Structured Workplace Learning Experience
Good Fit	All six graduates report, and transcripts confirm, a clear occupational focus, including a sequence of program classes. Early program coursework (often focused on job search skills, workplace etiquette, employer expectations, range of jobs in field) is seen as the foundation for later courses focused on developing specific job skills and knowledge.	Graduates report rare instances of academic and vocational coursework integration. Some occupational teachers saw potential benefit of integrating academic and vocational coursework, but only two instances of limited collaboration with academic teachers toward this end were cited. There is one strong and one weak example of classwork related to work experience during hospital internships.	Emphasis on "hands-on" learning in classrooms; five of six graduates report using equipment and supplies like that encountered in internships or other work experience. Some use of projects and group work reported. Assignments based on job shadowing, interviews, field trips, and job- or career-related research.	Workplace learning required in all six programs. All six graduates completed workplace components ranging from one semester of program-related co-op work, to individual internship placements and a yearlong, supervised clinical nursing internship.
Poor Fit	Most graduates do not recall a clear occupational focus in their sequence of program courses. Those that do, lack interest in the field of focus or see content as outdated. Coursework on occupational issues, job search, and workplace relationships are seen as unrelated or of variable merit.	No student reported instances of integrated curriculum. Teachers interviewed reported no cases of curriculum collaboration.	Mostly traditional "classwork." Some use of group work, and two cases of simulation (both from same program).	External work-based learning not a requirement of any program. One program offers within-school work experience (dental laboratory at school). Internships available to small number of students in one program. Two graduates had co-op work placements arranged, but not required, by their program.

Support for Student Achievement

Reformers have advocated greater "personalization" in high schools, arguing that student achievement will improve when school organization enables teachers to devote close attention to the academic progress, social development, future goals, and general well-being of students. To what extent are the good-fit and poor-fit cases differentiated by their experience of a "personalized" environment? Have teachers and other adults earned the trust, respect, and affection of these graduates? Are the programs designed to promote closer contact between students and teachers so that students' academic and career-related needs and goals are known and can be supported by teaching staff? What is the nature of guidance and support for postsecondary academic and career options? Table 4.3 summarizes the experiences of the good-fit and poor-fit graduates with respect to three broad categories of supports for student achievement: (1) adult-student relationships, (2) program design, and (3) postsecondary education and career advising practices.

Personal and Academic Support for School Success

Virtually all of the graduates professed admiration for teachers or counselors who encouraged them to do well, showed faith in their abilities, and related to students in ways that go beyond "just doing the job." The "caring" that students attributed to some teachers is a complex notion, encompassing teachers' interest in and expectations of students, their demeanor in the classroom, their attitude toward their jobs, the effort they devote to their classroom instruction, and their willingness to help with both personal and academic difficulties. Although the graduates embraced a similar vision of supportive teachers and/or programs, the good-fit graduates found personal and academic support within their career magnet program while the poor-fits did not.

All of the good-fit cases spoke eloquently of program teachers who took a personal interest in them, pressed them hard to achieve, and recognized their accomplishments. Across cases, the themes were remarkably similar. Program teachers were "very caring . . . compared with the other teachers" (G4); they "went beyond what you had to learn . . . (they were) a lot more personal . . . a lot more interested in you" (G3); "they were more personal than other teachers" (G5); program teachers "make the students united . . . and they really show that extra caring" (G2). Although not every graduate recalled approaching a teacher about a specific personal problem or issue, as a group the good-fit graduates emphasized that students were able to talk to program teachers "about anything." Thus, Case G1 reported that her nursing program teacher was "like a mother . . . whatever troubles we had, we brought to her." Another good-fit graduate summed up a program adult's role as "teacher, grade advisor, mother . . . everything in one" (G6).

Table 4.3
Support for Student Achievement

Case Type	Adult-Student Relationships		Program Design			Career Advising	
	Personal and Emotional Support	*Academic Support*	*Student Cohort*	*Teacher Team*	*Progress Monitored*	*College Counseling*	*Career Counseling*
Good Fit	All six graduates use strikingly similar terms, describing program teachers as "personal," "caring," and interested in students' lives beyond school.	Graduates describe teachers who push students to excel, hold high standards, and provide support and recognition.	Four of six graduates were part of a student cohort taking all or most of their classes together during at least 11th and 12th grades. Two were members of a cohort for program classes only.	All graduates recalled a group of teachers responsible for program students. Four of six teachers described teamwork—usually confined to curriculum design issues. One instance of teamwork including both academic and program teachers.	Three of six programs routinely reviewed report cards to track continued academic eligibility for program students. One program reviewed program class grades only; two programs had no formal monitoring structures.	All six graduates recall ongoing encouragement to continue their training or education after high school, but no evidence of instrumental support by teachers (e.g., help with college or financial aid applications). In four cases, potential college majors were discussed in introductory occupational classes. In the other two cases, program teachers discussed possible college majors, and college representatives were brought in to speak with program students.	In four cases, potential jobs/careers were discussed in introductory occupational classes. In one case, students were encouraged to take an interest inventory to identify careers for which they were suited. Three programs took students on a series of field trips allowing them to observe possible occupations in their programs' fields.
Poor Fit	Personal and emotional support reported in three of eight cases—all outside program.	Five cases report at least one person who encouraged them and pushed them academically—all outside program. Two cases report academic support tied to program, but in senior year only.	One of eight cases was a member of a program cohort during 11th and 12th grades.	Three instances of program teacher teams.	Three cases of monitoring eligibility for program or work co-op placement. One case of coach monitoring athletic eligibility (not program-based).	One case of good access to guidance, extensive information on college preparation and college expectations (not program-based). Three cases of minimal guidance; four cases of no guidance.	Virtually none were described by graduates. One graduate recalls one program speaker.

The picture of "care" on the part of influential adults that emerges from the good-fit graduate encompasses not only personal support but academic encouragement and aid as well. One graduate recalled that his clerical procedures and social studies teachers were "constantly reminding" him that he had to do well in school (G3). The graduate said the academic encouragement he received from program teachers made him feel "important, exceptional." Another graduate (G4) said her program teacher was "always there . . . if I needed help in any subject." Case G5 remembered that the nursing program teachers "bothered us more to go to college" and were available "if we needed any help in that. . . . They knew what you were striving for, and they tried to help you." An accounting program graduate (G6) spoke of two program teachers who "always made time for me . . . when I needed to talk about schoolwork, especially accounting." She was strongly encouraged to stay in accounting because she was "so good at it."

Interviews with the good-fit teachers parallel the graduates' accounts in important ways, underscoring relationships that combined academic pressure with a personal interest in students' lives and well-being. All six of the good-fit teachers spoke of pushing students to prepare for college or work and about responding to students' personal concerns or problems. Thus, the clerical procedures teacher (G3) reported that her conversations with the graduate revolved around "getting his education and moving on into a career." She is genuinely proud of the graduate's academic turnaround after entering the program in eleventh grade. After receiving his award for academic improvement she says, "he was so happy (to be) recognized . . . . [H]e had come a long way." Echoing the G6 graduate, an accounting teacher remembers telling her "to go into business because she was so good in accounting." This teacher speaks of a personal bond with the student as well: "She never had a problem coming to me with anything that was troubling her . . . and I have no problem with holding a kid." In other good-fit cases, nominated adults speak in terms of personal and academic support they provide for program students in general:

> I let them know that they're capable of doing anything. [I'm] maybe a little closer to the travel & tourism students . . . because a lot of those kids . . . I've known for three and four years. [G4]

> The advice I always give all my students in general [is] not to let anyone tell them what they cannot do, what they cannot be. I try to be a role model for them. . . . I also let them see another side of me. Many teachers are always afraid to let them see the other person, not the teacher. [G2]

> I try to be a role model for them, not only in the classroom, but also I was her instructor in the clinical area at the clinical site. . . . It was a pretty cohesive group, and they felt that with me they could discuss almost anything. Not only schoolwork. Sometimes they would come in with a few personal problems. [G1]

Of the poor-fit cases, only one (P1) experienced a strong constellation of support throughout her high school career. All of the adults she considered significant—academic teachers and counselors—were outside her law studies program. They pushed her hard to achieve high standards, "opened doors" to extracurricular opportunities and leadership roles, and gave her specific and wide-ranging advice on career and college planning. This case stands out as an anomaly; although the school she attended was a poor fit with the Magnet Model, P1 nonetheless enjoyed many of the same kinds of supports, outside of her career magnet program, that were characteristic of the good-fit group.

The remaining poor-fit cases experienced much more varied and idiosyncratic kinds and sources of support. In two cases, interactions with the nominated teacher were so infrequent as to be virtually ineffectual (P2, P3). In two other cases, students at serious risk of failure experienced islands of personal support and academic assistance outside their program. A counselor's campaign to see Case P8 graduate led her to arrange tutoring, insist on attendance at night school, and structure an in-school internship experience—all interventions that appear to have been made absent any coordination with the graduate's teachers. A graduate who had floundered throughout his first three years of high school (P5), recalled an English teacher who expressed faith in him and who helped him with assignments even after he had completed his only class with her. Although his counselor had attempted to talk with him about his poor grades, he admitted having paid little heed to her warnings (though he did consider them an attempt to help). By contrast, he responded to the English teacher's constant encouragement and help:

> I just loved her 'cause she was there for me. And . . . whenever I did have a problem in the class with a assignment or whatever I would go to her, and she would explain it to me much better . . . [make] certain that I could understand it. [After that class] she still didn't stop. She still was on me. My job wasn't done until I finished school. Yeah, she still was on me, which is special though. . . . She never let me down and . . . I didn't let her down. [P5]

In the remaining poor-fit cases, the graduates' personal relationships with an adult made high school a more congenial place on a day-to-day basis, but did little to help the student with school achievement or future

planning (P4, P6, P7). Athletics formed the sole shared interest for two of these students and the adults they named as influential. In the final case, a work co-op coordinator provided a potential dropout with an unexpected sense of accomplishment by arranging a successful work placement during twelfth grade. The coordinator asserts that by virtue of his role as co-op coordinator he knew "her exact academic average, her exact attendance record. And if she had any problems with any of the personnel here at the school—any teachers, did she have any problems with the dean, was she ever suspended." However, there is no indication from him or from the graduate that they ever actually discussed her school record, despite the fact that the student was surprised she had qualified for work co-op. She explained, "My grades were horrible. To this day, I can't understand why they contacted me, 'cause you had to have grades. That's what I was told, you had to have good grades to be in co-op. I couldn't understand; my grades were horrible." By both accounts, the focus of this relationship was the co-op job placement, workplace attitude, and demeanor, rather than personal support or academic encouragement:

> [With] all the students . . . I have a similar theme throughout the school year, that you have to be able to deal with all the problems that you have on the job and be able to adjust to the various situations, that you can't start something, quit, get into problems right away. . . . And she was able to adjust. She was very successful. [P6]

Compared to the teachers identified by the good-fit graduates, the adults considered significant by the poor-fit graduates were either less available as strong role models or were less comprehensive and consistent in the direction they set for students. For instance, a dean (P4) sends a graduate mixed messages by encouraging him academically, while making it easy for him to cut classes; an English teacher (P5) opposes the academic career focus of her school, saying "high school should be a time for personal discovery;" a basketball coach (P7) is seen as offering information, recognition, and leadership roles that are absent in the rest of the school experience.

Program Design

Academic career-focused programs can achieve a high level of program definition partly through course offerings and program requirements, and additionally through aspects of program organization. The Magnet Model presumes the presence of three organizational features to provide students with additional academic support: (1) student cohorts, (2) teacher teams, and (3) mechanisms for monitoring academic performance.

Student Cohort

By student cohort, we mean a group of students who identify with the program, take at least their program courses together, and complete a common set of requirements. At its best, a cohort design may help to reinforce the program's focus, enhance motivation, and broaden the kinds of support available to students. It may also reduce flexibility, leaving some students locked in to programs in which they are not thriving and others closed out of programs to which they are attracted in their junior or senior year.

The good-fit graduates more frequently described themselves as belonging to a distinct group of students who were taught and counseled as members of a program. Thus, G1 was able to recount the way in which her cohort moved as a group through a series of courses: "body structure, the nutrition, our nursing class." She and other students in her cohort often wore uniforms to school and thus were visibly distinct as well. With the introduction of the classroom/clinical rotation sequence in eleventh grade, students became part of a ten-student "cohort within a cohort." An assistant principal responsible for a variety of health career programs at the school explains that all students, regardless of their specialization, take both their clinical and academic courses as a cohort in their eleventh- and twelfth-grade years:

> All of the students that are in Health Careers [including] the dental assist, medical assist, nurse assist, they all go as a cohort in the eleventh and twelfth grade. . . . They have to do it that way because they are in and out. They're in [school] two weeks, out two weeks, so that's why they stay with their own particular little group. [G1]

Similarly, students in the travel and tourism program (G4) took most of their classes together during eleventh and twelfth grade, went on field trips together, reviewed applications of tenth-grade students who applied to the program, and engaged in other program-based activities that marked them as a group.

Altogether, four of the six good-fit cases reported membership in a well-defined group or grade-level cohort. In these cases, the cohort design enabled not only closer relationships between adults and students, but also among the students themselves. Thus, a graduate of the practical nursing program (G1) recalled, "So that was your nine best friends, that was it. That was just about you and these other people, so you did everything to look out for yourself and them." These good-fit graduates talked about the academic support they received by virtue of their cohort membership. For instance, G2 contrasted students in her academic classes who were "always making jokes and being clowns" with secretarial program students who were "really geared toward doing our work." A health careers graduate (G5) recalled the importance she attached to passing all of her program

classes: "It was like a competition with everybody, so . . . you had to do good."

Only one of the eight poor-fit cases described such a cohort. A dental tech program graduate (P4) attended the same school as G1, and, like her, found himself in a small cohort of students who completed classroom and clinical work together in the eleventh and twelfth grades. Unlike G1, however, he found the small cohort confining. A highly social student, indifferent to the career theme of his program and expressing little attachment to it, Case P4 felt more constrained than supported by a small cohort.

Teacher Team

A teacher team is a group of teachers who consider themselves affiliated with a career magnet program; who take deliberate steps to plan, coordinate, and possibly teach elements of the program together; and who work together to monitor the academic progress of program students.

While all of the good-fit graduates recalled a specific group of teachers responsible for teaching program classes, in only one case (G4) did we find an "ideal" teacher team as described above. In the travel and tourism program, a four-teacher team (including two teachers assigned exclusively to the program and two teachers who also taught English or social studies) shared a common prep period each day, which facilitated curriculum planning and program coordination. Students took all of their classes together during eleventh and twelfth grades, enabling team-teaching in the program. For instance, the program's social studies teacher and English teacher (who also served as program coordinator) would sometimes "make it a double period (with) both classes in the room working on something together. . . . [I]t gives them some type of continuity, connection." During common planning periods, this team regularly reviewed academic transcripts of program students and discussed ways to assist students "who [were] having problems."

In three other good-fit cases, we find some evidence of team-initiated curriculum coordination and academic monitoring. Case G1's program teachers met weekly to monitor students' grades and discuss curriculum. Case G2's teachers met as a group three times each term to maintain curriculum alignment, and Case G6's teachers worked together to coordinate curriculum so that a teacher "may have been a day or two ahead of another teacher . . . but it was still within the same framework." Beyond these limited examples, our visions of tightly coordinated program teaching teams did not materialize even among the good-fit cases.

Because none of the poor-fit case graduates nominated teachers from their programs as influential, program teachers were not interviewed in poor-fit cases. Thus, we cannot comment on the status of teacher teams in the programs to which poor-fit graduates were assigned.

Monitoring Student Progress

We speculated that one way career magnet programs and teachers might provide support for academic success was through individual and collective monitoring of program students' grades and attendance. The good-fit and poor-fit cases differ in the degree to which teachers appeared to know about the graduates' performance in classes other than their own. Again, because we did not interview poor-fit program teachers, we have no reliable way of determining the degree to which these programs attended to the academic progress of program students; however, even among the good-fit cases, evidence of systematic monitoring of grades and attendance is found only in the three programs with academic eligibility requirements (G1, G4, G5).

Travel and tourism program teachers (G4) routinely reviewed transcripts together, "So if [a program student] was having a problem in another class, I would know about it." While the teacher did not mention the "gatekeeping" function related to this review process, the graduate reported that only students with good academic records were admitted and retained in the program. In two other cases (both nursing programs), grades were also monitored regularly because "they have to maintain a certain average in order to stay in the program" (G1). A counselor was assigned exclusively to program students, and she "keeps them informed about . . . things they must do before they graduate, and if they're deficient in whatever, they must see her to get it taken care of." In the other nursing program (G5), teachers maintained close contact with all of the students' grade advisors and obtained their grades in all courses. A program teacher reported that if a student was not doing well in classes, "part of my job was to go and find out why." In all three cases where we found systematic monitoring of student records, we also found that students were aware of their program teachers' knowledge and interest in their performance in both program and academic classes. For instance, Case G1's nursing teachers often reminded students that "we talk with your teachers so we know exactly what's going on and what you're doing," and the Case G5 nursing program graduate recalled that at report-card time her program teacher "would be right there . . . into everybody's report card."

Cases G2 and G3's program teachers confessed that there was no structured mechanism for monitoring student progress but said they sometimes seek out information about program students' academic standing and encourage them to do better if they are not doing well in their classes. Both of these programs (secretarial studies and clerical procedures) accept students without regard to their academic standing. Consequently, monitoring for eligibility is not required in these programs. In the accounting program (G6), teachers held weekly "conferences" during which they would "throw out a name of a kid that a teacher was having a problem with, and discuss certain things to try to get that kid back on the right track." This within-program monitoring did not extend to program students' academic classes nor include any academic teachers.

Among the poor-fit cases, we found evidence of only one program with a provision for monitoring student performance—another health careers program with academic eligibility requirements for continued enrollment. Overall, in the poor-fit cases, communication among adults about student progress was apparently rare, and students were largely unaware of what knowledge their teachers had or shared about their school performance:

> I never knew what the process was. If they give me a grade, do they see what the other teachers who have me before them graded me? . . . I never knew if it was because it pertains to their class or the whole thing in general. I wouldn't know what they knew. (P2)

College and Career Counseling

College and career counseling services, both formal and informal, constitute another source of support for student achievement. In neither the good- nor the poor-fit cases do we find examples of program teachers or counselors working with students on college applications and essays or advising them about financial aid possibilities. From both good- and poor-fit graduates, we hear about introductory occupational classes that addressed general employment issues such as résumé writing, interview etiquette, workplace demeanor, dress codes, and employer expectations. Overall, however, good-fit graduates were more likely than poor-fit graduates to encounter varied sources of information about possible postsecondary college majors and careers, as well as frequent encouragement to continue their education after high school.

All of the good-fit graduates recalled program teachers who "pushed" them to go to college. Thus, Case G3 reported that his clerical procedures teacher "always had me thinking about college, even though I was in the eleventh grade . . . constantly!" An accounting program graduate (G6) recalled discussions with two program teachers and her grade counselor regarding college majors. They all strongly encouraged her to continue in accounting because she was "so good at it," and advised her against taking time off between high school and college. Referring to the adult she nominated as influential, the graduate said, "She was like, 'you're GOING to college.'" Even Case G1, who confessed that she did not heed the advice of program teachers who "pushed" her to get her college applications in during her senior year, remembered program teachers talking about college "all the time." She also recalled "college information days" specifically focused on colleges with nursing programs. Outside speakers provided information about college programs and industry opportunities in the travel and tourism program as well (G4).

For some poor-fit graduates, the images of college verged on caricature. Case P4 is a good example of this. Unlike Case G5, who "pretty much imagined how (college) would be" because program teachers talked about

it "all the time," Case P4 was shocked to find that college was unlike the image he had gleaned from popular media:

> I expected it to be like, you know college you see on TV. TV, I'm like "Wow, this is college." It's like this big room with one professor and like 2001 students. I'm saying "Like college looks good." I get into this school, sit in a little rinky dink room. There's this Professor, blah, blah, blah. I'm your teacher. "Like, all right, fine. Maybe this is just one section. It was the whole health program. Maybe like five rooms. I'm like, "Nah, this ain't for me."

Each of the good-fit graduates remembered class assignments aimed at acquainting them with possible jobs in their program's field of focus. In half of the cases (G1, G4, G5), graduates recalled researching and reporting on various careers they were interested in or for which their programs were preparing them—"the salary, the benefits, the goods, the bads" (G1). The secretarial studies program graduate (G2) remembered a class assignment requiring her to develop career paths projecting ten and twenty years into the future. Program students also completed "goal sheets," which were displayed on walls around the classroom. "The whole wall was all different types of goals from different people," which the students then discussed as a group. In the clerical procedures program (G3), the teacher acquainted students with a range of careers and college majors and encouraged them to take an interest inventory. The graduate explained, "She let us know all the stuff we could do in business, that the stuff she taught us we could apply." The teacher told them about a computer program at the employment office "that if you type in all the stuff, you know, all your skills . . . and your personality, it will give you a list of all the careers you can go into. . . . That's how I found the (college) major I'm in now, which is hotel management."

Half of the good-fit graduates were acquainted with possible program-related jobs through a series of field trips. The travel and tourism program (G4) organized field trips to airlines, travel agencies, and hotels in order to expose students to various occupations in the field. During hotel tours, for example, "kids would actually see the different phases . . . housekeeping . . . general manager, front manager, what engineers do." The secretarial studies program graduate (G2) also recalled "a lot of field trips . . . to get an idea of what it's like to work for an insurance company . . . [or] into courts for court stenographers." Nursing program students (G1) participated in a semester-long "Life Cycles" class, which amounted to a series of field trips to pediatric units, day care centers, rehabilitation clinics, and retirement homes.

Poor-fit graduates recalled little or no guidance or information about postsecondary career options. Case P1 asserted, "I never got that, to be honest with you. And throughout high school, I'm not gonna say I was

ignorant, but we weren't really given a big overview of what the world had to offer in terms of occupations. . . . It would have helped." In three poor-fit cases, adults mentioned field trips and outside speakers as features of some of the schools' occupational programs, but program graduates did not recall such activities.

How the Graduates Fared: High School Performance and Postsecondary Directions

The high school experiences of good-fit and poor-fit cases differed in clear and visible ways. The two groups encountered quite different levels of program focus and coherence. They formed different relationships with teachers and other adults, and had access to different sources and types of support and guidance. Good-fit graduates enjoyed meaningful program-related work placements; poor-fits did not. Do these differences in context and design matter? Although our data do not permit us to demonstrate a causal relationship between organizational features and student outcomes, they do show that the two groups performed differently in high school, attached different values to their high school experience, and seem to have launched on different paths in the years immediately following graduation. Table 4.4 summarizes the findings in this section.

Academic Performance

We used three indicators of academic performance to compare the good- and poor-fit cases: cumulative grade point average and grade point trajectory from ninth to twelfth grade, record of failed classes, and the related incidence of "on-time" graduation.

Cumulative Grade Point Average and Grade Point Trajectory

At the end of ninth grade, good-fit graduates had a mean GPA of 73.8; poor-fits averaged 69.3. By the time they graduated, the mean GPA of the good-fit cases was up 3.5 points to 77.3; the poor-fit average improved as well, up 2.7 points to 71.0. As a group, the good-fit graduates had entered high school with a slightly higher standardized reading test score average (58 vs. 56.9) and a higher math score average (75.8 vs. 70.6). The higher average GPA for the good-fits may be partially explained by their higher tested ability. Nonetheless, the GPA gap of 4.5 grade points that existed between the two groups at the end of ninth grade had widened to over 6 points by the end of twelfth grade. Both groups showed a dip in GPA during ninth grade, but the poor-fit cases dropped more and recovered less over a four-year period.

At the individual level, GPA proved relatively stable over the four years of high school. Half of the good-fit cases and five of the eight poor-fit cases show almost no GPA fluctuation after ninth grade. None of the graduates had a marked decline in GPA after ninth grade. Of the four low-achieving

Table 4.4
Student Performance, Perceived Value of High School, and Postsecondary Status

School/ Program Type	GPA, Record of Failed Classes, and On-Time Graduation	Seriousness of Purpose in School/Planfulness about Future	Value of What Was Learned	Post-Grad Status
Good-Fit Cases	Mean 9th-grade GPA - 73.8 Mean 4-yr GPA - 77.3 2 failed no classes 3 failed 4 classes 1 failed 13 classes All on-time graduations One student required summer or night school credit to graduate on time	Two graduates were serious and conscientious throughout high school. In the other four cases, schoolwork was not taken seriously at all during 9th grade (a lot of cutting, failure to prepare for exams). One case did not make serious effort until 11th grade. By 10th or 11th grades, all cases were serious about graduation, and three mentioned being particularly concerned about performance in program classes. Three of six report active efforts to get informed about college and to gain access to sources of information. Five of six applied to college during their senior year.	All six cases report having gained useful knowledge and skill from their high school experience, particularly from their program classes and activities. All six emphasize practical skills.	Five of six cases are consistent with emphasis in high school. Four graduates in college, two financing college with jobs related to programs. One of the four in a major unrelated to high school program.
Poor-Fit Cases	Mean 9th-grade GPA - 69.3 Mean 4-yr GPA - 71.0 3 failed < 5 classes 2 failed 9 classes 3 failed > 20 classes Three of eight delayed graduation. Three required summer or night school credit to graduate on time.	One of eight was serious, planful, well-informed, consistent in efforts throughout high school. Seven graduates report being "naive," "confused," "lost," "having fun," and trying harder only in 11th and/or 12th grade.	Two of eight graduates believe they received good education, both say they would have responded to more academic challenge. Two graduates say high school helped them become "responsible." Both had weak academic records, but did graduate after their fifth year. Four graduates believe they gained little or nothing from high school.	Four of eight are in college in majors unrelated to program focus, one on academic probation and planning to quit, and one financing school with a job in program field. Three employed, two as unskilled laborers. One is neither employed nor in school.

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students in the poor-fit group, two showed some modest improvements in their grade point averages after ninth grade, but neither would attribute this gain to the influence of their career magnet program. The single "at-risk" student in the good-fit group (G3) achieved a dramatic gain following a program change from accounting to a highly defined, but less academically demanding program in clerical office procedures. In the absence of sufficient cases, it is not possible tc consider whether students with a record of academic failure in the ninth grade might be substantially helped by affiliation with a well-designed career magnet program.

Record of Failed Classes

The graduates' record of failed classes reveals an interesting distinction between the good- and poor-fit cases (see Appendix 3, this chapter). One good-fit graduate (G3) failed 13 classes, 12 before joining the clerical procedures program during eleventh grade. Three graduates (G4, G5, G6) failed four classes each, with Case G4 failing all four classes before joining the travel and tourism program in eleventh grade. Cases G1 and G2 failed no classes during high school. Among the poor-fit cases, three graduates (P2, P5, P8) failed between 22 and 25 classes, including several program classes. Some failed the same course twice (see Appendix 2, this chapter). Cases P3 and P4 each failed nine classes, Case P1 failed 4.5 (all science labs), Case P6 failed two classes, and Case P7 failed one.

On-Time Graduation

The graduates all began high school in the fall semester of 1988. In all six good-fit cases, graduates completed high school in the four years conventionally allotted, although Case G3, who had failed 13 classes during ninth and tenth grades, needed both night and summer classes to graduate on time. Not surprisingly, two of the three poor-fit graduates who failed over 20 classes (P5, P8) took a full five years to graduate, and Case P2, who failed 25 classes, required summer and night school classes to graduate six months after her class. The two poor-fit graduates who failed nine classes also attended summer or night school to graduate on time.[8]

Overall, we did not find a meaningful difference in achievement between the two groups. While the good-fit graduates as a group had a slightly higher GPA than the poor-fit graduates, 12 of the 14 cases were low to mid-range achievers, including five students who were at-risk of failing by the end of ninth grade. However, the difference in the number of classes failed

[8] Acknowledging that older adolescents may have compelling reasons to balance school with other obligations related to family and work, we are cautious about attributing delayed graduation to school-specific experiences. Among this sample, however, we have no evidence that such external constraints account for the failure of those students who did not complete school in four years or who required summer or night school credits to graduate in four years.

by the two groups may be related to the striking difference we detected in the value that the two groups attached to what they learned in high school.

Instrumental View of School

We sought two kinds of evidence to assess the extent to which the graduates attached instrumental value to what they learned during high school. First, we looked for indications that they valued what they were learning while they were still in high school. We looked at the seriousness with which they had approached their schoolwork and the degree of "planfulness" they exhibited in thinking ahead to postsecondary work or education. Secondly, we looked at the graduates' retrospective evaluations of what they had learned in high school.

Seriousness of Purpose

Looking back on their high school years, the graduates talked about how they had approached class assignments and tests, whether they took class attendance seriously, and how they judged the work they were being asked to do. Of the six good-fit cases, two (G2, G4) reported taking their school seriously throughout their high school years. Thus, Case G2 rarely cut a class and said she was "there to learn." Case G4 reported that she "never cut classes" and "would go over my notes, like, every night." Both of these graduates mentioned the importance they attached to doing well, particularly in their program classes. While Case G6 missed a large part of ninth grade and had trouble focusing on classwork, hers was a special case—her mother was dying of cancer, and the graduate recalled spending most of her time at home that year. Her mother died early in her sophomore year. The graduate began a counseling program and studied "a lot" that year "'cause I knew my grades were bad in my freshman year. . . . I knew it was gonna be hard work and less time for myself."

The other three good-fit graduates (G1, G3, G5) had spotty records of attendance during ninth grade and, with the exception of Case G1, paid little attention to homework or test preparation. Thus, Case G1 recalled that during ninth grade "I was in so much trouble. . . . I would cut, but . . . I always came back and caught up; and if there were tests, I'd pass the tests." Case G5 exemplified the attitude both she and Case G3 had about school and schoolwork during ninth grade: "I always started out saying 'I'm gonna study, I'm gonna study,' but I never really did." She said she was pretty good about doing her homework, "if not I would like copy from somebody, which wasn't good." Case G3 recalled that after being held back in ninth grade for failing eight classes, he was "disappointed in myself. . . . I actually got mad at myself. I was angry." During tenth grade, he started getting "back on track" and credited the clerical procedures program (which he entered during eleventh grade) with his academic "turn-around." During twelfth grade, he redoubled his effort in school: "Time was a big factor. . . .

(There) was no more next year." Case G1 also noted the role her career magnet program played in curbing her cutting and increasing her attention to schoolwork. She reported that she was accepted into the nursing program in tenth grade, but was placed on probation, which meant that her attendance and grades were monitored by the program coordinator. While she "hated" being watched, she did in fact stop cutting, changed her peer group, and spent more time focusing on schoolwork because "that's what I had to do to stay in the program."

With a single exception (P1), the poor-fit graduates spoke of low or uneven investment in schoolwork throughout high school. A fifth-year graduate (P8) spoke of procrastinating: "[I] always said, 'I got time. I'll make that up in night school or something.' That's how I was. Man I put it off, put it off. Ah, I'll do it later." Case P5 recalled his tenth-grade year:

> I didn't too much go to class too much then. So at a test a friend would like, somebody else would tell me "there's a test 5th period, you need to come to class." You know, maybe he'll tell me 2nd period, and I can like get a couple notes from him, and he'll, you know, look out for me. I just study a little notes in the lunchroom. So if he gave it to me 2nd period, that meant I had to cut 3rd and 4th just to learn what I need to do in 5th.

In eleventh grade, this same graduate recalled, "I still was having a whole lot of fun. . . . I was having fun the whole year. I was . . . looking at (graduation) but I knew I wasn't at senior year just yet, so it wasn't that much on my mind." After continuing to cut classes in his senior year, he limped to a diploma with a 65.8 cumulative average and a confused notion of what might lie ahead: "I still was kinda confused, though. I mean I wanted to be a business person. I wanted to play basketball. I wanted to do a whole lot of things. I still was kinda confused. Still am to this day. Ha!" Other poor-fit graduates echoed this lack of concern over nearly failing out in ninth and tenth grade. Even at the time of their interviews, some poor-fit graduates did not appear to attach many consequences to a weak high school record. Case P4, who was neither employed nor enrolled in school at the time of his interview, believed he could "always go to college and pick up extra skills."

Case P6, who had considered dropping out in her junior year, confessed to a nearly complete absence of self-discipline, but argued (or hopes?) that high school has no necessary connection to future opportunity:

> About the future, what was my thinking? Well, I thought that without an education that it was gonna be hard to make it in the real world. But then, you know, I hear stories about people who are rich and don't even have a high school diploma. . . . People say

that you need a college education to get somewhere in this world and yet here goes this person who doesn't even have a high school diploma who's rich, you know. And sometimes, I guess, that's fine, you need a high school diploma, but you know, there are smart people without high school diplomas. It doesn't necessarily mean that you're inhibited or whatever in some way because you didn't go to high school. Some people are smarter than the people who have diplomas, you know. So I guess you have to choose your way, your path, you know, it's not the same for everybody. So that's why I'm, that's why I'm not, I'm not, ah, too afraid of not going on to college, you know, 'cause, you know, I just maybe, I, I, you know, maybe I still trust in God a little, you know, maybe. Let's see what happens.

Planfulness

With one exception (G1), the good-fit graduates recalled thinking a lot about college during their senior year, and four of the six applied to at least one college during twelfth grade. Case G1 concentrated primarily on completing the nursing program, graduating from high school, and passing the state LPN boards. She confessed to ignoring the constant "push" from program teachers during twelfth grade to get her college "stuff" in. Even Case G6, who did not end up applying during twelfth grade, talked to her grade advisor and program teachers about college "a lot" because she wasn't sure she wanted to go "right away." The other four good-fit cases had their sights fixed more firmly on college. Thus, Case G2 remembered being in the college office "all the time . . . just doing research." During twelfth grade, she "wasn't too concerned about graduating. I was more geared towards, um, college. . . . I applied everywhere." During twelfth grade, Case G3 said he "started realizing about the future now. You know, I had to pick a career and I had to pick a major to go to school. And then I had to, um, think about what college is going to be best for me." He heeded the advice of his program teacher, taking an interest inventory and selecting his college major based on the results. Case G4 recalled that high school made her "look forward" to college. "I didn't want to stop . . . I wanted to learn more." She was accepted to the only college she applied to during twelfth grade. Of all the good-fit graduates, Case G5 recalled the most comprehensive and long ranging plans for the future. She applied to several college nursing programs and planned on completing a four-year degree and gaining employment before even considering marriage.

Case P1 had her eye firmly fixed on a law career after college and sought out college information during extensive conversations with returning graduates, teachers, and counselors. During twelfth grade, Case P4 began searching college manuals "on my own." He was "looking into medical," and eventually enrolled in a health professions program offered within a

college that is more widely known for its business programs. Like other poor-fit graduates, Case P4 believed peers who told him that colleges attended only to performance in the junior and senior years, so effort during those years could compensate for an otherwise weak record: "I wanted to [improve] because colleges, you know, they say you have to do good your junior year in high school and your senior year. . . . And that's when I started studying." Having also heard from friends that "colleges like to see that you are a well-rounded student, that you don't just stay in one particular area," he also joined the Future Business Leaders of America. He found the group completely unrelated to his work as a dental lab student or to anything else he was doing, but thought it would "look good" on his record.

Beyond those two examples however, the poor-fit cases tended to think only as far as graduation. An accounting program graduate (P7) recalled that basketball was her one absorbing interest in high school. Looking back, she realized she had been "basically naive" about planning for college: "I wasn't really thinking about college that much. I just wanted to graduate." Another poor-fit graduate recalled:

> My last year, around graduation time, I was in space. I was just lost, I know—I didn't have no plans for nothing, I didn't even know if I was going to college. I was just out there, I just—make sure I graduated, make sure I got my diploma, that's all I was worried about.

What the Graduates Say They Learned

To the extent that these 14 graduates valued their high school experience, most did so for reasons that seem unrelated to basic academic preparation. All six good-fit cases credited their occupational programs with supplying them with useful knowledge and skills. Thus, a nursing program graduate (G1) said that her program prepared her to pass the state board examinations and "let me, at a young age, start in something and come out still young and have it. . . . The most important thing about the program was the opportunity to do something when I got out of school. School I didn't care for." An accounting program graduate (G6) said she learned that "teamwork is better than doing something on your own" and that her program gave her "the skills that I do now . . . typing, computers, word processing." She stated emphatically, "If anyone comes out of that institute and cannot get a job then there's something wrong with that person. . . . [T]hey show you everything . . . they train you." Case G2 said she felt confident coming out of high school because she "had skills to give to the job [and] . . . you can use your secretarial skills to get through my accounting program in college." Similarly, Case G4 felt that the travel and tourism program "really prepared me to do well. . . . [I]t taught me different things about business . . . nowadays

you need to know computers." Others also emphasized the acquisition of practical skills and experience:

> What I really learned is all the accounting [and] clerical procedures. . . . The stuff I learned in clerical procedures I can always use . . . in any business environment and in college. [G3]

> Health careers prepared me for like the basic classes [in nursing at college]. I'm not going to say I knew a lot, but it prepared me a little bit, enough to understand what the health careers environment was all about. [G5]

The poor-fit cases present a more mixed picture, both in terms of the aspects of schooling that they valued and in their assessment of the school's performance. Two of the graduates (P1, P7) felt that they had received solid preparation overall; both also felt that they could have been pushed harder to excel academically. Case P1 spoke forcefully of the strong academic grounding she had received, but said her law studies program was pedestrian and that all her teachers could have pushed her "even harder." Case P7 professed little interest in her accounting program, but believed she derived considerable benefit from being in a "specialized school" and wished only that she had also had a stronger "liberal arts" education.

Two others emphasized the school's contribution to their own personal maturity. Case P5 expressed satisfaction with the medical business program in which he finally experienced some modest success during twelfth grade and his fifth year of high school. The program "was real good, truthfully," helping him to "see what life was about" and that "you couldn't mess up" (e.g., calculate a person's mortgage wrong). Even Case P8, who graduated after five years with a dismal school record, credited the school with teaching him "responsibility" and with giving him a rudimentary background in computer technology.

Four of the poor-fit cases disparaged their programs or schools for a failure to supply them with practical knowledge and skill. They reported having learned little that would position them well for future work or school. Like Case P1, Case P2 was disappointed in her law studies program, saying it was "just regular social studies . . . stuff I just thought was irrelevant to know in law." Unlike Case P1, Case P2 extended this evaluation to her overall school experience: "I didn't feel that anything I learned would apply toward my life." Other poor-fit graduates echoed these sentiments:

> I didn't feel like I really learned much in high school. Skill-wise, you know, I—I learned how to type . . . I really didn't feel like I—I was capable of doing anything graduating out of high school. I didn't have—I felt like I didn't have no skill to do anything. [P3]

[I learned] that I can get a [entry-level] job and keep it . . . but I needed more. That's not enough. [P6]

I didn't learn jack. [P4]

Postsecondary Status

What path do these graduates appear to be following in the early years after high school graduation? We do not wish to attribute too much significance to the graduates' choices and circumstances only two years out of high school, but we have paid particular attention to the "fit" between the graduates' present circumstances and the aspirations they expressed or preparation they undertook in high school. Overall, the good-fit cases demonstrate a much higher degree of fit between the course of study pursued in high school and the education or employment in which they are now engaged.

Two years after graduation, five of the six good-fit graduates were either attending college and majoring in areas consistent with their high school programs, or they were employed in the occupational field of focus. Of the three graduates of business programs (G2, G3, G6), two are pursuing coursework in business administration and one is enrolled in a hotel management program. Cases G2 and G6 are both financing college with jobs in their programs' focus areas (clerical job with the city; accounts receivable clerk in a medical lab). The two graduates of health programs were both enrolled in college nursing programs briefly after high school and are now employed in the field; however, we find an instructive difference in their high school circumstances and postsecondary employment status. Case G1 completed a high school program that prepared students for LPN certification and provided hands-on experience in a hospital setting. Although program coordinators admit that relatively few students actually complete the state board examination, Case G1 did so and is currently employed as a Licensed Practical Nurse. Case G5's high school program was broadly defined as "health careers," with an emphasis on nursing. Absent a hands-on clinical component and a sequence of nursing-specific courses, it did not equip Case G5 to attempt the state examination. After a brief stint in college, she took employment as a typist in a medical laboratory. The remaining good-fit case, Case G4, is currently enrolled in a legal studies program and hopes to work as a legal secretary while pursuing a law degree.

Among the poor-fit cases, we find a higher incidence of postsecondary educational activity that appears unrelated to their high school program of record and that suggests limited future opportunity (e.g., more instances of low-skill employment). Of the eight cases, four are enrolled in college, three are employed, and one is unemployed. Of those in college, only one (P1) is following a path that will lead her to a career related to her high

school program. Majoring in political science and psychology, Case P1 planned to earn a law degree after completing her B.A. However, she asserted that any appearance of a connection between her high school law program and her persistent interest in the field of law would be illusory. She recalled that she "never really looked at high school as being a stepping stone toward anything." The law studies program was "basically social studies, which is stuff you do repeatedly over the years." Two poor-fit graduates were enrolled in two-year programs unrelated to their high school programs (P2 in marketing; P7 in law). At the time of the interview, Case P6 was attending college but was on academic probation and planning to quit.

Employment patterns among the poor-fit cases also demonstrate a weak connection to the career magnet programs in which the graduates had been enrolled. One student was neither employed nor attending school; two others were employed in low-skill jobs (loading trucks, serving pizza). Only Case P8's job as a clerk in the city's Human Resources Department appeared to reflect what he said he learned from high school: "a sense of responsibility and basic computer skills." Yet, he also said he was bored and looking for alternatives. Another poor-fit case (P7) was also using her program skills in her job, but she saw this position as temporary. Despite her dislike of accounting as a field, she was using her accounting skills to earn money while she pursued a pre-law degree.

Conclusion

We employed a range of interview and student record data to investigate the high school experiences and postsecondary directions evident among 14 graduates of career magnet programs. Among the 14 graduates, we find two groups clearly differentiated with regard to many of the hypothesized features of our Magnet Model. The good-fit and poor-fit cases differed in their experience of program definition and focus, close and continuous ties to adults, access to a student cohort and teacher team, availability of counseling resources, and career trajectories two years after graduation. At the same time, none of the graduates encountered the expected level of curricular integration. The limited evidence of active pedagogy in the good-fit cases stands out only against the paucity of similar experiences reported by the poor-fit graduates. Although there were indications that teachers embraced a dual mission of career and college preparation, we found only infrequent evidence that academic and vocational curricula were integrated. Consequently, the value of an integrated academic and vocational curriculum remains untested.

The good-fit cases stood out particularly for the constellation of supports that programs provided for students' academic success, personal well-being, and "planful" orientation toward the future. The poor-fit graduates report no experience of a "high definition" career magnet program in any

meaningful sense. Their stories point to a range of individual and institutional difficulties—from badly informed choices and shifts in student interest to weakly designed programs and disengaged teachers. The differences between good-fit and poor-fit cases draw particular attention to the importance that students attach to the combined pressure and support they received from teachers or counselors, and to specific program features such as a mechanism for monitoring academics and communicating student progress among teachers.

This paper raises two questions that cannot be examined adequately with the data in hand, but that would seem central to future inquiries into reform in secondary schools. The first centers on the part played by career magnet programs for students who accumulate a record of widespread academic failure and low attendance in the first year of high school. With only one seriously at-risk case among the good-fits, relatively little can be claimed with confidence, but it is possible that the difference between a good-fit and a poor-fit experience matters most to students whose ninth-grade record places them at risk of failure.

Our study further suggests a question regarding the matter of student choice. Students encounter different opportunities to exercise choice over the course of their high school years and receive different kinds of help and guidance in constructing informed choices. The opportunity to enroll in a career magnet program represented the first choice the graduates in our study were asked to make with regard to their high school careers. In the comprehensive career magnet cases, all of which constituted a "good fit" with the Magnet Model, this choice resulted from the individual initiative of students who had been lottery losers but who nonetheless found their way into academic career-focused programs in their comprehensive schools. At two of the career magnet schools, where various programs were oriented toward a single occupational domain (health occupations or business careers), students were able to negotiate a program change if their interest waned in the program to which they had originally applied. These students were able to transfer to a related program, maintaining a certain coherence in their studies and continuing to build skills in a given domain. All three of the cases from the third career magnet, which offers a variety of programs from diverse occupational fields, were poor fits with the Magnet Model. Students in this school faced an array of weakly defined programs with very different course sequences and may have been the most "stuck" if their initial choice proved a poor one. Helping students make informed decisions about high school programs, and allowing them the latitude to modify their initial choices, may be central to creating career magnet programs that attract.

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Appendix 1
Graduates' Gender, Race, and Parents' Education and Occupation

	Gender	Race	Father's Education	Father's Occupation	Mother's Education	Mother's Occupation
G1	Female	African American	No contact during childhood	No contact during childhood	Less than high school graduation	Nurse's aide
G2	Female	African American	Less than high school graduation	Mechanic	Less than high school graduation	Unemployed
G3	Male	Hispanic	Little contact during childhood	Little contact during childhood	Two or more years of trade school	Business manager
G4	Female	African American	Two or more years of trade school	Phone company	Less than 2 years of trade school	Phone operator
G5	Female	Hispanic	High school graduation only	Hospital housekeeper	High school graduation only	Hospital receptionist
G6	Female	African American	Completed 4-year college degree	Telephone technician	Completed 4-year college degree	Deceased
P1	Female	African American	High school graduation only	Self-employed (Import/export)	High school graduation only	Homemaker
P2	Female	African American	Less than 2 years of trade school	Engineer/driver (Mass transit)	High school graduation only	Homemaker
P3	Male	African American	Less than 2 years of college	Corrections officer	Less than high school graduation	Phone operator
P4	Male	African American	Ph.D	Minister	High school graduation only	Beautician
P5	Male	African American	Unknown	Deceased	High school graduation only	Unemployed
P6	Female	Hispanic	Less than high school graduation	Preacher	High school graduation only	Teacher's aide
P7	Female	African American	Less than high school graduation	Construction worker	Less than 2 years of trade school	Homemaker
P8	Male	African American	High school graduation only	Construction worker	Less than 2 years of trade school	Computer programmer

Appendix 2
Course Focus and Sequence in Good-Fit and Poor-Fit Cases

Good-Fit Cases - Occupational Courses Completed				
	9th Grade	**10th Grade**	**11th Grade**	**12th Grade**
G1 – LPN	Introduction to Occupations*	Health Occupations*	Body structure*, LPN clinical, Life cycles, Pract nursing 1, Pract nursing 2, Health instruction, Nutrition, Community health	Pract Nursing 3*, Pract Nursing 4*
G2 – Secretarial Studies		Stenography 1, Stenography 2, Formatting 1, Formatting 2	Stenography 3, Stenography 4, Transcription 1, Transcription 2, Business English	Office Proced 1, Office Proced 2, Exec Shorthand*, Legal/Medical, Steno*
G3 – Clerical Procedures (In accounting program during 9th and 10th grades)	Keyboarding	Bookkeeping 1, Bookkeeping 2, Business Math 1	Accounting 1, Accounting 2, Business law 1, Business law 2, Business math 2	Clerical Proced 1, Clerical Proced 2, Business Comm 1, Business Comm 2, Formatting 1, Formatting 2
G4 – Travel and Tourism (T&T is a two-year program beginning in 11th grade)	Introduction to Occupations*	Keyboarding 1, Keyboarding 2, Stenography 1, Stenography 2	Computer reservations, Word processing 2, T&T - English*, T&T - Geography*	Word Processing, Travel Program*
G5 – Health Careers	Introduction to Health Careers 1, Health Science - Global History, Health Science - English	Introduction to Health Careers 2, Occupational Health, Keyboarding 1	Bio-med, Medical office*	Classroom/Hospital Rotation*
G6 – Accounting	Keyboarding 1, Keyboarding 2	Information Processing*	Accounting 1, Accounting 2, Greggsten Accounting 1, Greggsten Accounting 2, Computer Math ½*	Introduction to Occupations*

Single period, semester-long classes unless asterisk indicates otherwise
* indicates yearlong or double-period class during single semester

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Appendix 2 (cont.)

Poor-Fit Cases - Occupational Course Completed				
	9th Grade	10th Grade	11th Grade	12th Grade
P1 - Law Studies	Law - Global Studies ½, Law – Global Studies ½, Woodworking and Plastics ½, Aerospace Shop 1**; *Aerospace Shop 2***	Law - Global Studies 5/6, Law - Global Studies 7/8, Keyboarding	Constit. Law ½, Constit Law ½, Am. Govt. Law ½, Legal Research ½	
P2 - Law Studies	*Law - Global studies ½, Law - Global Studies ½, Aerospace Shop ½,* Foreign Food**, *Fashion Careers**	*Law - Global Studies ½, Law - Global Studies ½, Keyboarding 3/4*	*Constit. Law 1**, *Constit Law 2**, *Am. Govt. Law 1**, Am. Govt. Law 2**	Keyboarding ½
P3 - Computer Technology	Woodworking and Plastics ½, Foreign Food**, Fashion Careers**	Keyboarding ½		
P4 - Dental Tech	Introduction to Occupations*	Health Occupations*	Dental Lab 1*, Dental Lab 2*, Health Instruction	Dental Lab 3*, Dental Lab 4*
P5 – Medical Business (Joined program in 12th grade)	*Introduction to Occupations 2, Introduction to Occupations 2*	*Introduction to Occupations 1,* Introduction to Occupations 1	Accounting 1, Accounting 2, Keyboarding 1, Business Core 1, *Business Core 2*	Accounting 3, Accounting 4, Keyboarding 2
P6 - Medical Business (Joined program in the 12th grade)	Introduction to Occupations*	Health Occupations 1* Health Occupations 2*	Health Instruction, Keyboarding, Law Studies	
P7 – Accounting	Keyboarding*	Accounting 1, Accounting 2, Business Math 1, Business Math 2, Health Education	Adv. Accounting 1, Adv Accounting 2, Business Law 1, Business Law 2	Money/Banking, Business Analysis, Investments 1, Investments 2, Comp Applications, Travel and Tourism
P8 - Computer Technology	Keyboarding*	*Basic Programming, Health Education, D.O.S.,* Data Processing, Health Education	*RPG Programming, D.O.S.,* RPG Programming	*Cobol Programming,* Comp Applications, *Business Analysis* 5th year Basic Programming, D.O.S., Business Analysis

Single period, semester-long classes unless asterisk indicates otherwise
* indicates yearlong course or double period class during single semester
** indicates quarter-long class
italics indicate failed classes – final grades below 65

Appendix 3
Failed Classes, Good-Fit and Poor-Fit Cases

	Number of Failed Classes, by Grade					
	9th Grade	10th Grade	11th Grade	12th Grade	5th Year or Summer	Total
Good-Fit Cases						
G1 - Health/LPN						0
G2 - Sec. Studies						0
G3 - Clerical Proc.	8	4	1			13
G4 - Travel & Tour.	1	3				4
G5 - Health Careers	1		3			4
G6 - Accounting	1	2		1		4
Poor-Fit Cases						
P1 - Law Studies	.5	1		3		4.5
P2 - Law Studies	6.5	7	4.5	7	.5	25.5
P3 - Comp. Tech.	2	1.5	2	3.5		9
P4 - Dental Tech.	7	2				9
P5 - Med. Business	2	8	7	5		22
P6 - Med. Business		1		1		2
P7 - Accounting		1				1
P8 - Comp. Tech.	5	11	4	5		25

Failures are reported in semester equivalents.
Physical education class failures are not included.

CHAPTER 5

Career Magnet Schools: Effects on Student Behavior and Perceived Parental Support: Part One

Gail L. Zellman and Denise D. Quigley

A large body of research on school effects indicates that school characteristics matter in student outcomes (e.g., Good & Brophy, 1986; Reynolds, 1992; Stringfield & Herman, 1995). Further, those characteristics that matter most are often alterable ones such as an orderly school climate, high teacher expectations for student performance, strong principal leadership, and a conscious effort to create a school environment that incorporates these elements (Stringfield & Herman, 1995). The goal of this paper was to explain what it is about attending a career magnet program that contributes to the better outcomes described in this volume.

Bryk, Lee, and Holland (1993) analyzed the reasons that disadvantaged family background is less predictive of educational outcomes in Catholic high schools than in public ones. They found that shared organizational beliefs, including an academic core curriculum for all students, an emphasis on academic pursuits, extensive extracurricular involvement and religious activities, and the importance of character development, combined with much higher percentages of staff who teach in these schools because they want to produce improved outcomes, account for this phenomenon.

While career magnets obviously do not offer the religious activities of Catholic schools, in many respects these schools are similar. Nearly all of the students (lottery winners and others) clearly want to be there; there is an academic core curriculum for all students so that career concerns do not replace academic ones. While traditional extracurricular activities are lacking in career magnets for want of time, the internships may serve some of the same functions. They may foster the building of personal relationships between student and employer, and student and advisor, as well as provide the reinforcement of one of the school's key organizing beliefs: the value of work and the possibility of a meaningful future career. Beliefs in the possibility of meaningful work and career success have, in turn, been associated with decreased involvement in high-risk behaviors such as alcohol and drug use, truancy, and unprotected sex and teenage childbearing (e.g., Dryfoos, 1990; Jessor & Jessor, 1977; Levitt, Selman, &

Richmond, 1991; Miller, Carol, Parkoff, & Peterson, 1992). The career magnet internship program also helps to reinforce the lessons of the classroom and a key shared belief among faculty and students: the importance and legitimacy of workplace socialization, including on-time behavior, appropriate attire, and personal responsibility.

In addition, like Catholic schools, the awareness of the family and individual sacrifice required for attendance (in Catholic schools, tuition payments; in career magnets, time required for often long commutes that may preclude paid employment), and the understanding that poor performance may lead to expulsion contribute to an environment of shared effort and improved outcomes.

Research also finds that a young person's family is an important force in shaping behavior and achievement motivation (Middleton & Loughead, 1993). Family background and processes are the basis from which career planning and decisionmaking evolve. Parents provide daily models of cultural standards, attitudes, support, and expectation and, in many ways, determine self-esteem, interpersonal skills, and role models for work (De Ridder, 1990).

At the same time, as young people mature and individuate, their behavior evokes parental responses that affect educational and career motivation and success. Students' behavior, motivation, and academic achievement influence the level of parental support and expectations for their child. Understanding these behaviors and motivational interactions between parent and child and their relation to young people's decisions about school and work is one of the key aims of these analyses.

By interviewing a sample of recent career magnet and comprehensive high school graduates who won and lost the career magnet lottery respectively, we hoped to collect data that would help us understand the institutional and family effects of career magnet programs.

Methodology

We chose to focus our analyses on two institutions that strongly influence young people's academic progress and outcomes: school and family. We were, of course, especially interested in identifying the effects of career magnet enrollment on students' academic and job-related outcomes, and on measures of emotional well-being. We also wanted to look at any impacts of career magnet attendance on family outcomes. To do this, we developed two models of institutional effects: one focused on the predictors of graduating from a career magnet or comprehensive high school; the other on an important family outcome—the students' perception of parental support for college attendance.[7] In the first model, significant predictors of

[7] We were somewhat stymied in this effort because of the nature of the interview process and the difficulties inherent in measuring career identity (e.g., Chartrand

career magnet graduation define key institutional effects of career magnet programs. In the second, significant predictors of perceived parental support for college clarify a complex process through which students communicate to parents their commitment to hard work and education, and parents in return signal a willingness to sacrifice financially to help a motivated young person pursue her or his goals.

Data

The 51 lottery "winners" and 59 lottery "losers" who agreed to participate in this study were interviewed by graduate students who asked a set of questions drawn from a pool of 440. Interview sections included school experiences since grade eight, overall evaluation of high school, career choice and development, work experience, educational outcomes, personal experiences, and family and background characteristics. The interview included a number of questions about career identity and career self-efficacy. Sample questions from all sections except family and background characteristics are presented in Box 5.1.

Semistructured interviews were conducted with teachers and administrators at four career magnet schools about their experiences with career magnets and the lottery. Where a teacher's tenure had predated the lottery, she or he was asked to talk as well about perceived differences in student body, teaching style, and her or his own sense of efficacy before and after the lottery began. For the most part, school-site interviewees were selected on the basis of willingness to cooperate and free periods that meshed with project staff schedules.

& Camp, 1991). Many questions were designed to elicit descriptive information only. For example, demographic and family characteristics questions would serve as checks on the randomized nature of the student assignment process; we did not expect to find differences on these variables between the career magnet and comprehensive high school groups. The interview form was set up so that most interviewees were eligible to answer only a fraction of the 440 questions on the interview form. Consequently, many of the most interesting questions were answered by only a small percentage of interviewees—too few to use many items in our models. This forced us to limit our modeling effort to those questions that were asked of all interviewees, a far smaller question pool. For this reason, some of the variables that we include in our models are in some cases proxies for other measures for which we had too few responses.

Box 5.1. Samples of Questionnaire Content by Section

General School Experiences (169 questions)
- Eighth-grade self-efficacy, high school choice, and college planfulness
- Attitudes and career ideas of closest high school friend
- School connected job-type, hours per week, wage (47 observations)
- Non-school connected job-type, hours per week (74 observations)
- Occupational course-content, hours spent, credit received

Evaluation of High School (39 questions)
- Choose school again
- Mentoring and formal counseling
- College planfulness, including parental support

Career choice and development (32 questions)
- Career ideas, ninth through twelfth grade
- Current occupational interest

Work Experience (101 questions)
- First, second, third, and fourth job history-search time, hours worked
- Current job-hours worked, starting and current wage (64 observations)
- Current job's relation to high school studies/career plans

Educational Outcomes (26 questions)
- Attended college since high school
- Number of college credits and grades in college

Personal Experiences (16 questions)
- Frequency of sexual activity, smoking, drinking, taking drugs, fighting

Sample

This analysis focuses only on the survey of graduates—110 in total. Of that number, 51 were lottery winners who attended and graduated from a career magnet program. The remaining 59 interviewees were lottery losers who applied to the same career magnets but attended and graduated from a comprehensive high school. The sample thus allows us to compare lottery winners who were admitted to career magnets by random assignment with lottery losers who applied to the same career magnets but did not win the lottery.

Analytic Approach

We attempted to identify variables that predicted graduation from a career magnet or comprehensive high school (Model I) and that created perceptions among students that their parent(s) were willing to make financial sacrifices to facilitate college attendance (Model II).[10]

[10] This latter measure is not an indicator of financial status, but the student's assessment of how important college attendance is to his or her parents. The options, which include "college is a waste of time and money"; "college is a good idea if you could get financial support"; "college is important, but not enough for the family to give up other things"; and "college is important enough for the family to

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The multivariate analyses used two estimation methods: (1) ordinary least squares (OLS) and (2) logistical regression (LOGIT). The latter method is preferred when the dependent variable is dichotomous, as is the case for both of our outcome measures because a linear specification may misrepresent the underlying functional form of the relationship between the dependent and independent variables. The coefficients of OLS regression are easier to interpret, however, as they indicate a percentage change in the value of the dependent variable due to a one percent increase in the independent variable. To benefit from the advantages of each method, the OLS regression results must closely replicate those of the LOGIT regression in terms of fit, error, and significance.

In this analysis, the coefficient estimates from the OLS and the LOGIT have similar levels of overall significance and have similar levels of significance on individual independent variables, which allows this dual method of statistical analysis. Therefore, both models were estimated and used for interpretation.[11]

Analyses

The process that was followed to select interviewees for this study was designed to retain to the extent possible the advantages of the initial lottery: two statistically equivalent groups that did not vary on key background variables. Because the interviewee selection process was not itself random, we decided that it would be a good idea to confirm empirically that the two graduate groups did not in fact differ on key background factors that antedate high school experience. Statistical tests (chi-square) revealed that the two groups of interviewees were not significantly different in terms of family structure, current marital status, whether they had taken the SAT during high school, or how often they had felt accepted or valued in high school classes.

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give up other things," were used to assess the extent to which some of the student's own behaviors affected his or her perceptions of parental support for college. No one chose the first option, "college is a waste of time and money." The second and third options, "college is a good idea if you could get financial support," and "college is important, but not enough for the family to give up other things," were combined, resulting in a dichotomous variable. The two options described parents who were perceived by their child as willing or not willing to make financial sacrifices to facilitate college attendance.

[11] In the discussion of results, the OLS regression estimates are interpreted and the LOGIT regression estimates are used to calculate the probability that typical students identified by the characteristics represented in the models by the independent variables were either graduates from comprehensive high school or career magnet programs (Model I) or perceived that their parents valued their college attendance sufficiently to make financial sacrifices to facilitate it (Model II).

Since we were looking for and hoped to find differences between the two groups in outcomes, it was important to document at the outset the different ways in which career magnet and comprehensive high school graduates had experienced high school. A most significant and expected difference between the two groups was the substantially higher level of career-related coursework that the career magnet students had taken. Career magnet students averaged 13.4 hours/credits of career-related coursework during high school; comprehensive high school graduates averaged 5.2 hours/credits. This large difference was not surprising given the focus of the career magnet programs.

We also found that career magnet students were significantly more likely to feel that their school was safe and desirable. For example, career magnet students were more than four times as likely as comprehensive high school students to rate their high school's reputation as "good to excellent." To some extent, these feelings may demonstrate cognitive dissonance at work: career magnet students had to travel farther and longer to reach their schools than comprehensive high school students did. They may also demonstrate the effects of selectivity: career magnet students wanted to be there, and they were twice as likely as comprehensive graduates to indicate that they would choose the same high school again. In addition, since we interviewed only graduates, there may have been students who did not perceive sufficient value added to stay at the career magnet schools. Indeed, attrition rates are substantially higher in career magnet programs. More optimistically, these positive assessments may reflect the shared values and increased success opportunities that characterize special schools.

Interestingly, we did not find some of the differences that we expected between the two groups on variables that are thought to differentiate career magnet and special schools from others. For example, we expected that career magnet students would report significantly more out-of-class and informal contacts with teachers and counselors. This did not prove to be the case. Indeed, we found that comprehensive high school students were significantly more likely to report having spent time during high school talking with a counselor about a career or future work; they were also significantly more likely to have gotten to know an adult on a personal level in high school.

At the same time, we found that career magnet students were significantly less likely to engage in a variety of behaviors that are associated with reduced school performance. Career magnet graduates were significantly less likely than comprehensive high school graduates to have ever been in a fight during or since high school; to have ever smoked, used drugs, drunk alcohol at least weekly; or ever became pregnant or made someone pregnant. In sum, 41% of career magnet graduates reported no risk behaviors, while only 19% of comprehensive high school graduates fell into the "no reported risk behaviors" category. Indeed, the reduced

incidence of these high-risk behaviors constituted the biggest differences between career magnet and comprehensive graduates.

The substantially lower incidence of a wide range of at-risk behaviors might well be due to the higher attrition rates in career magnet programs, discussed earlier. They may also reflect the impact of the institutional setting on career magnet students. An academic core curriculum for all students, shared beliefs in the importance of work, and the legitimacy of workplace socialization led to the enforcement of many behaviors such as punctuality, appropriate attire, and personal responsibility that are incompatible with high-risk behavior. The teaching of career skills may have led as well to a sense that work and a career could be attained, beliefs that are also incompatible with taking high risks.

Better behavior and skills acquisition appeared to pay off. Career magnet graduates indicated a starting hourly wage that was one dollar higher than that for comprehensive students, with the former reporting a starting hourly wage of $7.27, and the latter a starting hourly wage of $6.28. Current hourly wage also varied in the same way for the 61 interviewees who were currently working. Reported wage rate for the career magnet graduates was $8 an hour, while comprehensive high school graduates reported an hourly wage of $7.01.

These findings too could reflect differential attrition in the two groups of students. At the same time, there were indications that the high school experiences of career magnet and comprehensive high school students were rather different; these differences also could have affected student behavior and outcomes. These results suggested that we might be successful in modeling and understanding institutional effects.

As noted above, our analyses were directed toward two models. Variables included in each model were selected on the basis of several criteria. For the first model, we selected variables that proxied five constructs that theorists (e.g., Bryk et al., 1993) suggest are important in explaining institutional effects. These constructs included self-efficacy, career identity, institutional characteristics, student risk behaviors, and parental and family characteristics. To get closer to measuring these constructs, we collapsed some of the variables, and created scales from others. Prior to this construction process, we eliminated variables with "n"s below 100, as we believed that we needed at least that number of observations to reliably use the item. (In most instances, when the n was under 100, it was considerably under this number, averaging 60 to 80 because the item was not asked of all interviewees.) This left us with five "groups" of variables representing predetermined theoretical constructs.

Then, for each of the five groups, we separately ran regression analyses predicting career magnet or comprehensive high school program graduation to understand the interactions and individual impacts of variables within each construct. Variables that predicted at $p < .05$ were

also tested for proper model specification. (Tests for multicolinearity and heteroscedasticity were conducted before variables were included in the final equation.) Based on the hypotheses tested concerning self-efficacy, career identity, institutional characteristics, and parental influences, a model was constructed to predict high school placement.

For the second model, a similar approach was used. We chose variables that the literature suggested might be important predictors of perceived parental willingness to sacrifice for their child's college education. In this category, we included a range of student behaviors that might signal seriousness of purpose. These included self-reports of truancy, fighting in high school, other risk behaviors, performance in high school, occupational specificity, and self-efficacy. We selected these variables on the assumption that a major factor in a parent's willingness to support a child's college attendance is that child's level of commitment to education, as evidenced by good academic performance and the absence of behaviors that suggest lack of commitment (keeping in mind that parents' own educational level and financial status were randomly distributed across the two groups). Within each of the five construct groups, various hypotheses were tested to identify both potential predictors and influence among variables. Regressions were run to identify those variables significant at the $p < .05$ level. Then, the potentially significant (statistically and theoretically) variables were analyzed further in terms of their ability to explain the student's perception of his or her parent's willingness to sacrifice for college. We selected for inclusion in the model those variables that contributed most to explaining parents' willingness.

Both models were tested for multicolinearity and influential data points affecting the fit of the regression model.[12] The tests indicated that the models were specified correctly and did not contain colinear independent variables or influential data points.

Model I: Predicting Institutional Effects

Our analyses revealed that four variables together explain 24.5% of the variance in school program type. Table 5.2 reports the results from the OLS regression on school program type. These variables include the student's perception of parental willingness to sacrifice financially for college, the student's propensity to engage in risk behaviors during high school, the student's possible influential friendships during high school, and student's

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[12] Variance inflation factors were used to test for multicolinearity. First and second moment specification tests were used to test model fit. To check for influential data points, we conducted a test of a normalized change in the OLS estimate of the *i*th value of the dependent variable resulting from omitting the *i*th observation when calculating the OLS coefficient estimates.

were significantly more likely to have a closest friend who had career ideas is most significant. One's closest friend in high school is an important index and transmitter of social norms and values. Having a best friend with career ideas suggests that career magnet students are more likely to be exposed to an environment in which career thinking and career planning are normative. It is unconventional to present a regression equation with the independent variable "school type" used as if it were a dependent variable, but it allows us to demonstrate that the career magnets have an effect on each outcome even when the other outcomes are controlled. (A more traditional regression analysis confirms that these results are significant, including "closest friend . . . .")

This, in turn, is likely to facilitate one's own career thinking. Our life history interviews suggest that career magnet programs facilitate the establishment of friendships that are more likely to be based on shared career concerns because they bring students into a new environment peopled by students who are likely to have shared career interests, and do so at a time when friendships are more likely to form around more mature issues than those friendships formed in early adolescence at the beginning of junior high school. Our finding that career magnet graduates are significantly more likely than comprehensive high school graduates to report that their closest friend in high school came from school rather than from the neighborhood supports the notion that new friendships form and matter. In addition, attending a school in which half of the students are admitted on merit no doubt improves the overall quality of the student body, increasing the chances that school norms and individual friendships will encourage effort and success.

The model also reveals that career magnets may operate to minimize those behaviors that are inimical to school and career success. An extensive literature on risk-taking behaviors (e.g., Elliott & Morse, 1989; Hardy et al., 1997; Weinstein, 1980) tells us that students who smoke, drink, and act out in other ways are less likely to be successful in school and in life. Our model suggests that the school environment, no doubt aided by differential attrition, can act to reduce these behaviors. Strict rules in at least some of the career magnet programs represented in our study and the heavy focus on the future in all of them may have created an environment inhospitable to the development or manifestation of risk-taking in a population no more or less inclined to take risks than their lottery-losing counterparts. These forces may well have impelled risk-takers or potential risk-takers to leave school. In addition, a student body in which half of the students are selected on their merits contributes to norms that discourage acting out.

Other factors operating in career magnets may also reduce the inclination to engage in risky behaviors. More hands-on work, the promise of a marketable skill, and less "school-like" activities may contribute to students' reduced likelihood of acting out. Career magnets may also increase students'

confidence in ability during high school English classes most or all of the time. The logistic regression predicts that a student who perceives that his or her parents do not think that college is important enough to give up other things for, who reports having engaged in at least two high-risk activities in high school (e.g., smoking, drug use, fighting), whose closest friend in high school had no ideas about a career, but who felt confident most or all of the time in his or her high school English class has a 32.2% probability of having graduated from a career magnet program, while the same student had an 89.1% probability of having graduated from a comprehensive high school.

Table 5.2. Model I: Regression Results on School Type

Ordinary Least Squares	*Regression Coefficient*	*Standard Error*
Parents perceived willingness to sacrifice	0.274	0.088
Risk Behavior Scale	0.158	0.051
Confidence in English class	-0.168	0.060
Closest friend has idea about career	0.171	0.094
Logistic: Probability School Type is Career Magnet	*Regression Coefficient*	*Standard Error*
p = : 0.0001		
Parents' willingness to sacrifice	1.361	0.470
Risk Behavior Scale	-0.930	0.319
Confidence in English class	-0.962	0.347
Closest friend has idea about career	0.985	0.540

Note: School type is either career magnet or comprehensive high school; this is used as the dependent variable in the regression, making it similar to a multiple discriminate analysis.

Controlling for the other variables in the OLS regression model, we find that a student who perceives that his or her parents think college is important enough to make some financial sacrifices for is 27.4% more likely to have graduated from a career magnet than those who do not think their parents are willing to make such sacrifices. Reported risk behaviors in high school—including smoking, taking drugs, or fighting in school—were 15.8% less likely to occur at a career magnet high school. Having a closest friend during high school who had ideas about a career was 17.1% more likely among career magnet graduates. Finally, a student who felt confident in high school English classes most or all the time rather than none of the time or sometimes was 16.8% less likely to have graduated from a career magnet program.

These variables suggest that career magnet programs exercise important effects on enrollees. Conceptually, the finding that career magnet graduates

options, as they are intended to do. We learned, for example, that some career magnet graduates were using the skills that they learned in high school, particularly secretarial skills, to earn money to support themselves through college. Indeed, our data show that career magnet graduates had completed more college credits ($p = .068$) at the time of their interviews and were significantly more likely to have declared a college major.

The confidence about English variable is consistent with several other instances where lottery losers who graduated from comprehensive high schools described themselves as more confident; less worried, and more prepared for the world of work. The most parsimonious explanation for these findings is that classwork in comprehensive high schools may be easier. After all, comprehensive high schools lack the carefully and stringently chosen students who comprise half of the student body in career magnet schools, whose students must be diverse in terms of test scores, but typically have good grades and attendance. Combined with a small percentage of good readers chosen at random in the lottery, a plurality of career magnet students are high achievers. No doubt they raise both teacher expectations and the level of instruction in career magnet programs.

Finally, perceived parental support for college significantly distinguished career magnet and comprehensive students, with career magnet students more likely to report that their parents valued their college attendance and would be willing to sacrifice financially for it. There are several possible reasons for this effect. First, continuing to attend a career magnet program requires evident dedication and sacrifice, as discussed above. Long travel times in many cases require that students get up earlier and spend more hours in pursuit of an education than is the case for students who attend comprehensive high schools in the neighborhood. This commitment may be communicated to parents and increase their inclination to support the student's ambitions. Alternatively, the student who does all this may believe that he or she deserves parental sacrifice; this may predispose such students to report greater parental commitment. Other evidences of student commitment may also incline parents to be more supportive. As discussed above, we know that career magnet students are more likely to have a closest friend who has thought about careers. A fairly intense relationship with a serious peer may incline parents to believe that their child, too, is serious about getting ahead.

These speculations could take us only so far. We felt that perceived parental support for college was important enough to pursue in more detail since family values and expectations are a major influence in the educational choices that students make (e.g., Baker & Stevenson, 1986; Duncan, 1994). Consequently, we attempted to predict students' perceptions of their parents' willingness to sacrifice financially to help them attend college.

Model II: Perceived Parental Willingness to Sacrifice Financially for College

This model assumes that students' perceptions of parental willingness to sacrifice financially to help them attend college is a product of family ability to pay and the anticipated payoff of that investment. Since SES was randomized in this sample, we focus on the latter concept here. There is considerable data that indicate that lower-income parents value education as much as higher-status ones (Lareau, 1989; Lightfoot, 1978), but their own lack of education impedes the transmission of this value. Indeed, Lankard (1995) found that among Hispanic families in their study, parents valued education more highly than their children. At the same time, college is costly, and lack of money impedes plans for many. Certainly, if there are multiple children, parents are more likely to invest in the education of those children who appear motivated to succeed. The interaction of many individual behavioral or motivational variables within a family is a significant factor in studying family influence on career development (Middleton & Loughead, 1993). For these reasons, we included in the model a number of student behaviors that parents are most likely to be able to discern. For example, we think that parents are more likely to learn that their child has gotten into a fight in school or is drinking heavily than if their child is using drugs or smoking. We include an indicator of how much the student drank during their senior year: almost daily to two or three times a week, or occasionally to never. We include an indicator of whether the student ever talked to his or her parents about financial help to go to college. Based on what we found in Model I, we included institutional type in the model to test both the explanatory strength of institutional effects on perceived parental support predilections and to determine the strength of other factors on perceived parent behaviors controlling for institutional effects. Other variables in the model focus on a measure of the student's own career self-efficacy.

Our analyses revealed that the four variables together explain 21.3% of the variance in students' perceptions of parental willingness to sacrifice financially for college. Table 5.3 reports the results from the OLS regression. These include type of school attended, student's level of confidence that he or she will be in their desired career within the next six to ten years, student-reported drinking behavior in the senior year of high school, and level of college-related planfulness. This latter variable was scored as planful if the student indicated that he or she had talked to his or her parents about financial assistance in college. A number of other variables that seemed related (e.g., frequent truancy, reported fighting in high school, other risk behaviors such as smoking or taking drugs, other planful behaviors such as taking the SAT/ACT or visiting a college campus) were tried in the model but did not contribute to explaining perceived parental willingness to

financially sacrifice for college. Nor did a higher level of occupational specificity, reported happiness, or reported level of control over life appear to matter in predicting perceived parental support for college.

Table 5.3. Model II: Regression Results on Students' Perceptions of Parental Willingness To Sacrifice Financially for College

Ordinary Least Squares	*Regression Coefficient*	*Standard Error*
Adjusted r^2: 0.2139	0.300	0.085
School type		
Confident will be working in desired area in six to ten years	0.192	0.086
Quantity student drank during senior year	-0.164	0.069
Talked with parents about financial help in college	0.225	0.106
Logistic: Probability parent willing to sacrifice for college	*Regression Coefficient*	*Standard Error*
p = : 0.0001	1.515	0.470
School type		
Confident will be working in desired area in six to ten years	0.959	0.490
Quantity student drank during senior year	-0.963	0.425
Talked with parents about financial help in college	1.32	0.704

Note: n = 81

Logistic regression predicts that students who graduated from a career magnet, who are very confident that they will be in their desired career within the next six to ten years, who drank less in high school, and who discussed college finances at home are more likely to perceive that their parents are willing to sacrifice to send them to college.

Controlling for the other variables in the OLS regression model, we find that a student who graduated from a career magnet is 30% more likely than a comprehensive high school graduate to perceive that his or her parents are willing to sacrifice financially for college. Students who report that they are very confident that they will be in their desired career within the next six to ten years are 19% more likely than students with little confidence in this area to perceive that their parents are willing to make financial sacrifices to support college attendance. Those who reported drinking infrequently in their senior year of high school were 16.4% more likely to perceive that their parents would be willing to sacrifice financially for college. Those who reported drinking daily as high school seniors were 32.8% less likely than those who reported drinking less than two or three times a week to perceive such parental support. Finally, those who discussed

college at home were 22.5% more likely to perceive that their parents were willing to sacrifice so that they could go.

These variables suggest that behaviors on the part of the student while in high school such as commitment to schoolwork and career are associated with the student's perception that his or her parents support college attendance and are willing to sacrifice financially to help the student attend. The model reveals that the most important of the four variables is attendance at a career magnet. This may be because this is by far the most visible of the variables; it may also be that career magnet attendance, being associated with the other variables discussed in Model I, conveys seriousness of purpose to parents.

The behavior and college-related planfulness bear the expected relationship to perceived parental commitment to the student's education. Students who convey career orientation and confidence, stay out of trouble, and show evidence of their own commitment to attend college seem to pull (or perceive that they have pulled) such commitment from their parents. As discussed in Model I, career magnets appear to create for many students an environment in which behaviors that foster life success are more likely to occur. Model II suggests that career magnet attendance also may have a salutary effect on parents that is communicated to their children.

Discussion

Our data indicate that students who attend career magnet programs benefit from their involvement in them. The data also point to several ways in which these programs may achieve this effect. Career magnet attendance seems to reduce the likelihood of engaging in the sorts of risk-taking behaviors that mitigate against school and life success. Career magnet attendees report that they engage in fewer high risk behaviors overall, and their lower level of drinking in particular is associated with perceptions of greater parental willingness to sacrifice financially for college.

Career magnet students are also significantly more likely to describe their closest friend as being career oriented. This fact suggests that career magnet students may live in a world that is more supportive of career thinking and willingness to demonstrate concerns for the future. This future orientation is also expressed in their greater involvement in college planning activities, including discussions with their parents about college attendance. Career magnet students also seem to have a somewhat more realistic view of their own capabilities.

What explains these effects? Our data do not allow us to determine precisely what accounts for the institutional effects that we observed. We can offer a few ideas, however. First, there is the commitment notion. Continuing involvement in a career magnet requires continuing commitment, as evidenced by long travel times and consequently longer

hours devoted to schooling. Second, there is the social norm effect, about which we do have some data. If more career-committed students attend career magnets, they are more likely to create and transmit norms that support a career commitment. Indeed, our data show that one of the more powerful effects of career magnets is the greater likelihood that one's closest friend has thought about careers. The fact that career magnet graduates are significantly more likely to report that their friends come from school rather than the neighborhood supports the idea that career magnet schools work in part because by their nature, they foster new friendship groups and new group norms. These new friendship groups may matter because they contribute to an environment that supports hard work and achievement and eschews high-risk behaviors. The dramatically lower levels of a range of high-risk behaviors among the career magnet graduates suggest that the school setting suppresses these behaviors, which, in turn, increases the likelihood of positive academic and social outcomes.

Third, career magnets may generate more interest and effort because they represent more desirable environments for learning. Career magnet graduates were twice as likely as comprehensive school graduates to tell us that they would choose the same high school again, and they are four times as likely as comprehensive graduates to rate their high school's reputation as "good to excellent." Certainly, our interviewees told us that they felt far safer in career magnet schools; we heard informally that many students apply to career magnet schools primarily because of their reputations as safer learning environments.

Our informal interviews with teachers in some of the career magnet schools support this notion of a more facilitative learning environment. Some told us that they prefer teaching in career magnet schools because they feel that they have some leverage over students that is absent in comprehensive high schools: Students who misbehave can be sent back to their home school. In addition, the safer school environment acts as a unifying factor; since everyone values a safer environment and benefits from it, faculty and administrators feel more empowered to enforce rules and regulations that promote and ensure safety. This fits with our finding that career magnet students are significantly less likely to report cutting classes. In fact, we learned in one career magnet school that the absence of free periods during the day enables faculty and administrators to immediately identify students who are cutting class. Finally, faculty told us that the shared academic career focus of the school helps them to develop curriculum materials that are more relevant to students. Consequently, students become more involved in the work. An economics teacher told us, for example, that his students relate well to the concepts he introduces because so many of them are participating in the world of work and can relate class material to their on-the-job experiences. The shared focus on careers and the shared value of working and earning a living also allows

teachers to make demands such as public speaking in the service of becoming more marketable. In comprehensive high schools, students might well object to such a demand as there is no strong reason for it. Several teachers told us that a whole school of students who are studying related careers (e.g., health services) helps to create a community of committed students. All of these factors serve to increase teacher morale in career magnet schools, which contributes as well to a more positive school climate.

Another effect of the academic career focus is that students tend to take multiple classes from the same teacher. According to the teachers we interviewed, this allows them to get to know students better and inclines them to feel more responsible for students' performance and future plans.

Our finding that career magnet students are significantly more likely to believe that their parents value college and would be willing to sacrifice financially to enable them to attend suggests that career magnets may multiply their effectiveness by impacting on parents as well. The more pro-social behaviors of career magnet students, their greater commitment to school, and their increased likelihood of taking a series of steps to prepare for college all seem to incline parents to support college or at least to create that impression in their offspring. Since school and family are major factors in young people's lives, the fact that career magnet programs seem to exercise a positive effect on students directly as well as indirectly through their parents is particularly impressive.

Conclusions

Our data indicate that career magnet programs promote positive outcomes, and do so by increasing positive student behaviors and decreasing negative ones. Our best guess is that they achieve these effects by creating a school culture that supports hard work, dedication, and continuity of purpose. A safer learning environment allows this culture to flourish. A shared commitment to a general career area, combined with a commitment to learn about the world of work, clearly leads to a culture whose diverse elements combine formally and informally to promote career discussion, career and college planning, and realism about the future.

From a policy perspective, it is important to note that at least some of these effects are achieved because students who attend career magnets are all in some sense "winners" and, thus, feel grateful to be there. Continued attendance requires continued extra commitment. There is some evidence that the possibility of expulsion adds to the sense that these programs are opportunities that should be appreciated and not squandered. In addition, a student body enriched by those who entered the school on their merits contributes to the salutary effects of career magnet programs.

Another advantage that accrues to the career magnet experience is the sense of shared values that goes with it. As Bryk et al. (1993) note, a sense

of shared values allows teachers to make more demands of students, a key to successful teaching and learning.

Can career magnet effects occur in other settings? We cannot answer that question with our data; however, the data do suggest some of the key factors that promote positive outcomes among career magnet graduates. Policymakers and administrators would be wise to consider ways to encourage these effects in other contexts.

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Career Magnet Schools: Effects on Student Behavior and Perceived Parental Support: Part Two

Robert L. Crain

The Zellman and Quigley finding about parental support for college is one of the most important findings in recent research on high schools. Considering it, we decided for this report to take the next step and ask if the career magnet graduates were more successful in college. There is no difference in the rate at which students from comprehensive schools or career magnet programs begin college. We constructed a measure of college success by combining the number of credits earned by the time of the interview and whether they had declared a major.[13] Table 5.4 shows the result.

Table 5.4. The Relationship Between Career Magnet Graduation and College Credits Earned and Whether the Graduate Has Declared a Major

	Number of College Credits (n of Cases)	*Percentage with Declared Major (n)*
Career magnets	37.7 (42)	78% (41)
Comprehensive school	30.9 (50)	58% (50)
r, (significance level)	.194 (p = .07)	.212 (p = .02)

When the two variables are combined by standardizing each and summing, the correlation with career magnet assignment is .269, (p = .01). The effects are large and would be even larger if there were not "assignment errors" in our "experiment." In this sample, we selected only those students who had applied to the career magnets and either won the lottery and graduated from the career magnet, or lost the lottery and graduated from a comprehensive school. Unfortunately for our research, 11 of the students who entered comprehensive schools were later placed in career magnet programs, and since no record of program placement is kept, we did not learn this until we interviewed them. These students also have a high college

[13] The exact formula is to add the standardized versions of the number of credits, which ranged from 0 to 77, and the dichotomous statement that they did or did not have a major. When correlated separately with type of school, their correlations are .194 and .212, respectively.

success rate and make the relationship shown in Table 5.4 appear weaker than it would be if we had been able to omit the career magnet students from the control group.

As is often the case with good research, the questions that are answered raise new questions that are more interesting and often more difficult to understand. The questions asked about parental support seem straightforward—they seem to measure the family's financial resources and the parents' attitudes. Career magnets cannot possibly affect a family's finances, and it is hard to imagine how they could affect the attitudes of the parents more strongly than they affect the students' answers to any of the hundreds of questions asked about the student's attitudes and experiences. Zellman and Quigley pursue this analysis and find evidence that student commitment to a career, their sobriety, and the extent to which they press their parents for financial help[14] affect their parent's willingness to pay for college.

Zellman and Quigley also point out that the graduates, at the same time they were earning more college credits, were also working at higher paying jobs. We had an opportunity to observe the way in which career magnet students had been prepared for work. We "hired" the 30 students who participated in the life history interviews to come in as teams of career magnet graduates and comprehensive graduates in order to perform a group work exercise. The career magnet graduates came in on time, dressed for the office, and worked together much more effectively.

Career commitment and sobriety are affected by attending a career magnet. Zellman and Quigley's findings suggest that attending a career magnet, by changing a student in these ways and perhaps motivating them to press their parents for financial support for college, may cause their parents to change their behavior as well.

What can we make of this? There are several plausible hypotheses, but no easy way to test them.

- **Hypothesis 1: The School as Advertisement**
  Zellman and Quigley stress that even when student behavioral factors are taken into consideration (and every other question in the questionnaire has been tested), attending a career magnet school affects the student's perception of their parents. Most of this effect is not the result of any of the intervening variables that were measured in the two-hour questionnaire. This raises the possibility that there is a cognitive or ideological process here—that attending a career magnet is a sign to

[14] The actual wording of the question is, "A. Did you do any of the following things while you were in high school? . . . Talk with your parents about financial help to go to college?" Since the question is about what the student did ("Did you do?), it is safe to assume that this question refers to students approaching their parents rather than parents bringing the subject up.

parents that their student should go to college. The conclusion seems to be that part of what a school does is to serve as an advertisement, a persuasive argument, for college, independent of anything else the school may do for the student. According to this analysis, these data answer the question "What is in a name?" by saying "a great deal." Obviously, the name must be communicated over and over again in the words and actions of the adults and other students in the school; however, the goal of the program seems to have a value of its own, independent of how the program actually operates.

The power of the idea of the academic career-focused high school is transmitted through the student to the parents. The student of a career magnet who is drinking less, and who is pressing his or her parents for college tuition, has been affected by the idea of the career magnet and, in turn, is passing that excitement on to the parents.

- **Hypothesis 2: The School as Culture**
  This is the hypothesis that Zellman and Quigley lean toward, although they are appropriately cautious about the data, that perhaps the career magnet program creates a culture whose diverse elements combine formally and informally to promote career discussion, career and college planning, and realism about the future.

- **Hypothesis 3: The School as Career Preparation**
  Finally, we should consider the possibility that the academic career focus is not a catalyst for improving school quality but simply more important than school quality. Perhaps these high school programs are not better in any way, but they are a place where one is promised a career. Of all eighth graders, 82% apply to a magnet. More than half of these magnet programs are academic career focused. Perhaps students react differently because they are aware that they are being prepared for a career. Perhaps they are more supportive of the school, and more committed to their studies, as part of giving their school the benefit of the doubt because they think the school is trying to help them.

There are no doubt other hypotheses one could offer. Whatever the explanation, there is an effect worth explaining here. The effect of graduating from a career magnet is perhaps most striking in terms of what Zellman and Quigley call "risk behavior." Table 5.5 shows the impact of attending a career magnet on alcohol consumption.

Zellman and Quigley are correct in assuming that the randomized experiment eliminates the need for controls on background factors. To be certain of this, Table 5.6 tests for the effects of bias. There is a bias introduced, not in the randomization, but because the two types of schools differ in the type of students who can graduate. Graduates of career magnet schools

Table 5.5. Risk Behavior: Percentage of Career Magnet Versus Comprehensive High School Students Using Alcohol Weekly, by Grade

Grade	Career Magnet Graduates	Comprehensive Graduates
9	0%	0%
10	0%	4%
11	0%	3%
12	3%	17%
After Graduation	3%	26%
(lowest n)	(35)	(46)

had higher seventh-grade math scores than comprehensive graduates; almost none of the career magnet graduates in our sample have very low math scores. Chapter 2 shows that the career magnet programs are academically more demanding; however, Table 5.6 also shows that the presence of students with very low math scores among the comprehensive school graduates does not explain any of the difference in alcohol use. The regression shows that impact of the career magnets is only significant in eleventh and twelfth grades and in the postgraduate interview; in these grades, controlling on middle-school test scores, ethnicity, and parents' education actually increases the effect of career magnets. In Model II, in eleventh grade through postgraduate, graduates who have high math scores actually drink more, not less, but the results are not significant. In Model III, the multicolinearity among the four test scores makes it impossible to interpret the coefficients, including the supposedly statistically significant ones (in opposite directions!) for seventh- and eighth-grade math scores for postgraduates, so we cannot conclude that middle class graduates drank more than poorer graduates, but it does seem safe to conclude that they do not drink less.

Career magnet attendance not only reduces alcohol use; it also lowers the total risk scale scores (drinking, drugs, smoking, pregnancy, and fighting). Table 5.7 shows that controlling on background variables does not alter the impact of career magnet programs in reducing risk behaviors. (Combined risk behaviors are not measured separately for each year, so this table is in a different format.)

We were concerned that the lower levels of smoking, drinking, and pregnancy among career magnet graduates might be the result of the presence of a number of students from a Health Careers magnet; however, Table 5.8 shows that graduates of the three non-health career magnet schools also have lower rates than do graduates from comprehensive high schools. Tables 5.9 and 5.10 show similar results for respondents' perceptions of parental support for their college education and number of college credits earned. Again, controlling on background factors makes the apparent effect of career magnets slightly stronger. Table 5.10 shows that students with higher test scores have slightly more college credits, but the difference is not significant.

Table 5.6
Student Consumption of Alcoholic Beverages in Each Grade of School, by Lottery Outcome and Seventh- and Eighth-Grade Background Factors (Standardized Regression Coefficients, * = p < .05)

	Grade					
Model	**8**	**9**	**10**	**11**	**12**	**Postgrad.**
(1) Career Magnet	-.120	-.160	-.107	-.225	-.232	-.181
(2) Career Magnet	-.124	-.196	-.129	-.269*	-.289*	-.234
Math 7	.010	.165	.090	.197	.258	.239
Reading 7	.087	-.013	.125	-.059	-.082	.004
(3) Career Magnet	-.101	-.182	-.122	-.306*	-.286*	-.189
Math 7	.167	.261	.134	.200	.267	.548*
Reading 7	.083	-.059	.002	-.292	-.278	.011
Math 8	-.237	-.165	-.124	-.117	-.107	-.429*
Reading 8	.058	-.106	.213	.376	.317	.092
(4) Career Magnet	-.132	-.235	-.166	-.306*	-.339*	-.217
Math 7	.191	.277	.134	.222	.296	.606*
Reading 7	.044	-.079	.003	-.311	-.308	-.022
Math 8	-.246	-.187	-.140	-.124	-.110	-.445*
Reading 8	.060	.122	.230	.379	.317	.070
African American	-.218	-.636*	-.540	-.390	-.375	-.182
Caribbean American	.084	-.426	-.488	-.253	-.167	-.065
South American	.355	-.306	-.329	-.135	-.118	.184
Language Minority	.168	.320*	.204	.229*	.328	.156
(5) Career Magnet	-.128	-.266*	-.208	-.326*	-.361*	-.231
Math 7	.154	.268	.152	.231	.308	.621*
Reading 7	.049	-.098	-.026	-.324	-.323	-.033
Math 8	-.211	-.161	-.135	-.122	-.110	-.452*
Reading 8	.059	.126	.236	.382	.320	.075
African American	-.169	-.686*	-.644	-.438	-.432	-.226
Caribbean American	.126	-.442	-.542	-.279	-.198	-.092
South American	.371	-.343	-.396	-.167	-.154	.161
Language Minority	.306*	.356*	.235	.243	.342*	.157
Mother's education	-.125	-.146	-.088	-.039	-.264	.067
Father's education	.028	.206	.240	.110	.121	.004
Multiple R by Model						
Multiple R (1)	.120	.160	.107	.225	.232	.181
Multiple R (2)	.151	.222	.215	.282	.321	.296
Multiple R (3)	.198	.243	.251	.358	.371	.387
Multiple R (4)	.357	.407	.360	.419	.469	.468
Multiple R (5)	.374	.456	.421	.430	.482	.473

Table 5.7
Combined Risk Behaviors, by Lottery Outcome and Seventh- and Eighth-Grade Indicators (Standardized Regression Coefficients)

Model	Career Magnet	Math 7	Read 7	Math 8	Read 8	African American	Caribbean American	South American	Language Minority	Moth. Educ.	Fath. Educ.	Multiple R
I	.263*											.263
II	-.277*	-068	-.109									.280
III	-.257*	.212	-.045	-.185	-.054							.302
IV	-.280	.240	-.052	-.175	-.064	-.174	-.194	.033	.075			.343
V	-.273	.233	-.047	-.172	-.151	-.180	-.180	.046	.072	-.001	-.035	.345

* Indicates results are significant to the .05 level.

Table 5.8
Mean Level of Risk for Each Magnet School and for Comprehensive Schools

School	Mean (n)
Business	.00 (2)
Health	.17 (6)
Business	.73 (15)
4 – Career	.33 (12)
Comprehensive	.91 (47)

Table 5.9
Parental College Support by Lottery Outcome and Seventh- and Eighth-Grade Indicators (Standardized Regression Coefficients) (beta)

Model	Career Magnet	Math 7	Read 7	Math 8	Read 8	African American	Caribbean American	South American	Language Minority	Moth. Educ.	Fath. Educ.	Multiple R
I	.359*											.359
II	.415*	-.341*	.231									.461
III	.405*	-.396	.350	.141	-.206							.478
IV	.387*	-.396	.396	.099	-.209	-.313	-.415	-.224	-.014			.508
V	.378*	-.360	.351	.069	-.178	-.342	-.455	-.233	-.024	.135	-.090	.526

*Indicates results are significant to the .05 level.

Table 5.10
College Credits Earned by Lottery Outcome and Seventh- and Eighth-Grade Indicators (Standardized Regression Coefficients) (beta)

Model	Career Magnet	Math 7	Read 7	Math 8	Read 8	African American	Caribbean American	South American	Language Minority	Moth. Educ.	Fath. Educ.	Multiple R
I	.282*											.282
II	.291*	-.053	.201									.334
III	.254*	-.302	.247	.395	-.157							.399
IV	.252*	-.334	.278	.386	-.141	-.132	-.293	-.233	-.074			.442
V	.263*	-.319	.284	.365	-.142	-.127	-.299	-.225	-.093	.097	-.091	.455

*Indicates results are significant to the .05 level.

Does the Lower-Graduation-Rate-Bias Invalidate Our Results?

The career magnet schools graduate only 36% of their entering ninth graders, while comprehensive high schools graduate 41%. This certainly means that the career magnet graduates are a more carefully selected group. This introduces a bias into the experimental design; however, we are convinced that this factor is not nearly strong enough to invalidate Zellman and Quigley's findings. The data show that no control variable appreciably lowers the effect of the career magnet attendance on parental support for college. Secondly, there are mathematical reasons that virtually prohibit the existence of any factor powerful enough to eliminate the relationship between career magnet attendance and parental support. In essence, the argument is that a 6% difference in graduation rates cannot explain a 30% effect on parental support. A small number cannot support a larger number.

It is important to bear in mind that the experimental design eliminates all the unknown factors that might distinguish the lottery winners from the lottery losers; the only significant factors are those that occur after randomization has occurred, namely the differential acceptance of students into the comprehensive schools or career magnet programs, and the differential dropout rates of the two kinds of schools.

The argument presented below, that the difference in graduation rates cannot explain the difference in parental support, uses what is sometimes referred to as a "contradiction proof." The demonstration will show that if it were possible to eliminate all the relationships between career magnet attendance and parental support by controlling on a factor biased by the difference in graduation rates, then the impact of this biasing factor on the graduation rate would be so large as to defy credibility.

First Demonstration

The argument is made in two ways. First, some factors, such as middle school grades, are excellent predictors of both high school graduation and parental support. Since the graduation rate is lower for career magnets, career magnet graduates should have better middle school grades and, hence, probably have parents with a stronger predisposition to help their children with college costs. The question is, can a factor or combination of factors like this explain the strong relationship between career magnet attendance and parental support?

Let us assume that there is such a factor—call it "f"—perhaps built by combining a large number of factors into a single variable. Since the career magnet graduation rates cannot directly affect parental behavior, or even the students' perceptions of parent behavior, we must postulate a two-step process:

Graduation rate "g" → unknown factor "f" → perceived parent support, "p"

In educational research, correlations between student-level attitudes or behaviors are rarely higher than .3; correcting for measurement error might push the correlations "rgf" and "rfp" as high as .5. If so, the correlation between career magnet graduation rates and parental support, "rgp," would be no higher than .25. To be on the safe side, let us assume it is .95. The assumption we are testing in this "proof" is that the correlation between attending and graduating from a career magnet compared to a comprehensive school, "c," and parental support, "p," will be reduced to zero if we control on the graduation rates of the two types of schools, "g." Since the randomization prevents the career magnet attendees from differing from the students attending the comprehensive schools, any difference in the value of "f" for the career magnet and comprehensive graduates must be because of the lower graduation rate in the career magnets. (This assumes that there is no difference in the kind of students who graduate—both kinds of schools have the same kind of standard for graduation in terms of test scores and grades, and the same kind of work is required to obtain passing scores in classes and on tests—except that the standard is higher for the career magnets. In other words, we assume no second-order interaction effect between the "f," the graduation rate, and whether the program is career magnet or comprehensive. We drop that assumption in the more complicated version of this proof, below.)

In order for "f" to explain away the relationship between career magnet attendance and parental support, we must assume that the higher parental support of the career magnet graduates shown by a correlation between parental support and being a career magnet graduate, rcp = .306, is entirely or largely explained by the correlation between being a career magnet graduate and being in a school with a lower graduation rate, "rcg." This means the partial correlation of career magnet attendance and parental support, controlling on the student's program's graduation rate, must be near zero.

$$rcp.g = \frac{rcp - rcg.rgp}{(1 - rcg2)^{1/2}(1 - rgp2)^{1/2}}$$

The correlation between being a career magnet student and the student's program's graduation rate is based on the difference in graduation rates of the two kinds of schools and is .052. The correlation between being a career magnet graduate and possessing high parental support is .306. Substituting those values,

$$rcp.g = \frac{.306 - .052rgp}{.9973\ (1 - rgp2)^{1/2}}$$

A value of rgp = .95 would produce a value of rcp.g = .14, still considerably greater than zero, but it is impossible to imagine a particular student's program's graduation rate being correlated .95 with any aspect of a student's life, or a student's perception of her or his parental support being correlated .95 with any other variable. Worse yet, eliminating the correlation between career magnet graduation and parental support would require a correlation above .95. Our initial assumption, that career magnets do not raise parental support, has led to a contradiction, and is therefore false.

We can demonstrate the same point in another way. We found that 55% of career magnet graduates reported having parental support for college, while only 25% of those from comprehensive schools said this. Imagine that the student's perception of parental support for college is perfectly correlated with the child having the ability to graduate from high school, and that only 19% of the students who enter these high schools, whether career magnet or comprehensive, have this parental propensity. Suppose that in career magnets, all 19% graduate, and an additional 17% of the student body, who do not have parental support, also graduate, giving an overall graduation rate of 36%. Now suppose that all 19% in comprehensive schools also graduate, but an additional 22% of the students graduate as well, so that the graduation rate rises to 41%. The relationship between graduating and perceiving parental support could not possibly be stronger than this (still assuming no interaction effect). With these assumptions, the percentage of graduates from career magnets who perceive that their parents will support them is 53% (.19/.36), which is slightly below our actual results. In the comprehensive schools, the percentage of graduates with parental support is 46% (.19/.41). The difference between career magnets and comprehensive schools is 7% (53% - 46% = 7%). The actual difference is 30%, over four times as large. At a minimum, over three-fourths of the effect of career magnet attendance on the graduates' perceived parental support cannot be explained by the lower graduation rate of career magnets under the most extreme assumptions.

Since the effects of attending a career magnet on the risk behavior of students and their college achievement are about two-thirds as strong as their effect on perceived parental support, these effects are also strong enough so that they cannot be explained away by a difference of graduation rates.

We noted earlier that we had assumed that the correlation between parental support and graduation is the same in career magnets and comprehensive schools—that is, that graduates had more parental support than did dropouts, and that this was equally true for career magnets and comprehensive students. The more complicated of our two contradiction proofs drops this assumption, and allows for the possibility that career magnet dropouts might have higher or lower levels of parental support

than do dropouts from comprehensive schools. Differences in who drops out can explain the higher support rate of career magnet graduates, but only if we assume that the graduates of comprehensive schools believe they have less parental support than do the comprehensive students who did not graduate, which seems not credible. There are two proofs needed. The first is for a purely theoretical model that assumes that graduating from high school does not affect level of parental support for college. The proof is arithmetical as follows:

1. Since we assume that attending a career magnet versus a comprehensive school does not affect level of parental support, lottery winners and lottery losers have identical amounts of parental support, "p."

2. Since 80% of lottery winners attend career magnet schools and graduate at a rate of 36%, and these graduates have a 55% rate of perceiving parental support for college, then .288 (.8 x .36) of all lottery winners are career magnet graduates, and .512 (.8 - .288) are career magnet nongraduates. This implies that .1584 (.288 x .55) of all lottery winners are career magnet graduates with parental support.

3. We know that 20% of all lottery winners do not get into a career magnet, and since the vast majority (see Appendix B) attend comprehensive schools, let us assume that these students have a graduation rate of 41%. This means that .082 (.20 x .41) of all lottery winners are comprehensive graduates, and .118 (.20 - .082) are comprehensive school nongraduates. The survey finds that 25% of comprehensive graduates have parental support for college. This implies that .0205 (.082 x .25) of all lottery winners are comprehensive graduates with parental support. This, in turn, means that .1789 (.1584 + .0205) of lottery winners are high school graduates with parental support.

4. If we assume that the proportion of nongraduates from career magnets who perceive parental support is "Y," and the proportion of nongraduates from comprehensive schools who perceive parental support is "Z," then the proportion of lottery winners who did not graduate from career magnets and perceive parental support for college is .512Y, and the proportion of lottery winners who did not graduate from comprehensive schools and perceive parental support for college is .118Z.

5. Following the same procedure for lottery losers, 30% attend career magnets, where their graduation rate should be 36%, and their level of parental support should be 55%, while the remaining 70% attend mostly comprehensive schools, where their graduation rate should be 41% and their level of perceived parental support will be 25%. This means that

.0594 (.30 x .36 = .108 x .55) of all lottery losers will receive parental support because they graduated from a career magnet, and .0718 (.70 x .41 = .287 x .25) will receive support because they graduated from a comprehensive school, totaling .1312. In addition, .192Y (.30 x .64 x Y) will perceive parental support because they did not graduate from a career magnet and .413Z (.70 x .59 x Z) will perceive parental support because they are nongraduates from comprehensive schools.

6. Since the lottery winners and lottery losers are assumed to be unaffected by the school they attended, the two groups should have identical levels of parental support:

$$P = 1789 + .512Y + 118Z = .1312 + .192Y + .413Z$$

simplifying, $.0477 + .321Y = .295Z$

$$.1617 + 1.088Y = Z$$

Solutions for this linear relationship show that for reasonable values of parental support for career magnet dropouts, "Y," we get

if $Y = .10$, $Z = .2705$

$Y = .20$ $Z = .3793$

$Y = .30$ $Z = .4881$

In all cases, the amount of parental support perceived by dropouts from comprehensive schools exceeds that perceived by dropouts from career magnets, and in the last two cases, noticeably exceeds the amount of support perceived by comprehensive school graduates, none of which seems possible. The original assumption, that the positive effect of career magnets is due entirely to the fact that career magnets have a lower graduation rate, is contradicted.

Second Demonstration

In the second "proof" we can go one step further and ask whether the result obtained in our survey is due to a combination of the lower graduation rate and sampling error. If we assume that the true difference between the perceptions of career magnet and comprehensive graduates is 1.69 standard deviations lower than measured by the survey, a possibility that could occur 5% of the time, the same set of calculations gives the equation

$$.019 + 1.088Y = Z$$

This equation once again shows the amount of support perceived by comprehensive school nongraduates to be greater than that perceived by career magnet school nongraduates, so the contradiction remains.

CHAPTER 6

Placing the School-to-Work Transition in the Context of Adolescent Development

Anna Allen

In response to the profound ongoing changes in the U.S. economy, analysts and researchers have challenged traditional methods of preparing secondary students for the workforce (Berryman & Bailey, 1992; SCANS, 1991). Traditionally, secondary students have been taught job-specific skills or prepared for college. Now, secondary schools are called upon to teach every student "generic work-related skills" so that the entire workforce will be able to participate in an economy that is increasingly technological, information-based, and fast-changing. One of the earliest national efforts to define these generic work-related skills was produced by the Secretary of Labor's Commission on Achieving Necessary Skills (SCANS) in 1991. In this report, SCANS identified five competencies and a three-part foundation that constitute workplace know-how:

Workplace Competencies

- *Resources:* Must know how to allocate time, money, materials, space, and staff.
- *Interpersonal Skills:* Can work on teams, teach others, serve customers, lead, negotiate, and work well with people from culturally diverse backgrounds.
- *Information:* Can acquire and evaluate data, organize and maintain files, interpret and communicate, and use computers to process information.
- *Systems:* Can understand social, organizational, and technological systems; can monitor and correct performance; and can design or improve systems.
- *Technology:* Can select equipment and tools, apply technology to specific tasks, and maintain and troubleshoot equipment.

Foundation Skills

- *Basic Skills:* reading, writing, arithmetic and mathematics, speaking, and listening
- *Thinking Skills:* the ability to learn, to reason, to think creatively, to make decisions, and to solve problems

- *Personal Qualities:* individual responsibility, self-esteem and self-management, sociability, and integrity

Though ways of thinking and organizing and interpersonal interactions are commonly defined as skills, this shorthand presents problems when educators try to teach these competencies as skills in secondary schools. When students learn to type, they begin a new activity with which they have little or no experience. They do not have to unlearn one method of typing in order to learn a new method. On the other hand, students have already established ways of interacting with other people, well-developed habits of mind, and particular ways of using resources like time or money by the time they enter high school. For each individual student, these competencies are the result of a particular personal history. Students have different conditions, events, people, and expectations that they must assimilate and to which they must respond and adapt. They also have different kinds of resources and opportunities. The result is that every high school student has a lifetime of habits of mind, beliefs, and attitudes that are adaptive to his or her own particular environment. These adaptations, however, may not be adaptive to a high-performance workplace or even to a high-performance secondary school. In other words, students are not blank slates, as John Dewey reminded us.

Yet, students still need to acquire the "workplace know-how" as described by SCANS. If we think of the SCANS competencies as skills, we invite failure with those students whose family and community situations have neither expected nor supported the styles of thinking and learning or the kinds of interpersonal interactions identified by SCANS. These students have already developed a particular way of relating to others and handling information and resources. What can high schools, charged to prepare students to "work smarter," do to assist students to develop workplace know-how that is markedly different from their own ways of interacting with their physical and human environments?

Most high schools try to do this by providing appropriate information about what students will need to enter college or the workplace. Information is critically important, but learning situations that require active participation and that provide the necessary resources may be a more efficient kind of support. For example, graduates in our study frequently mentioned advice from a teacher to "look the interviewer in the eye" when being interviewed for a job. This is important information, but what about all the other behavioral indications of self-confidence during the interview? If the young person does not feel confidence in him- or herself, that lack of confidence will communicate itself to the interviewer in other ways.

A more comprehensive approach is to reframe preparing students for the workforce within the context of adolescent identity development and identify those contextual variables that require and support identity

formation. Primary emphasis then shifts from a focus on a long list of skills to the whole person. Emphasis also shifts from classroom instruction to the creation of complex situations that require and support students' adaptation to an environment similar to what they will encounter in a high-performance workplace.

Erik Erikson (1959) provided the earliest psychosocial definition of identity: a stable, consistent, and reliable sense of who one is and what one stands for in the world. It is also described as a sense of continuity with the past and a direction for the future (Marcia, 1993). As conceptualized by Erikson and Marcia, identity is an internal psychosocial construct that allows investigators to explain individual constancy and change, the way a person is experienced as the same to self and others over time while continuously adapting to constantly changing environments. Identity is a bridge between the core person and the context.

Adolescence is the period of time during the life span when identity is first formulated and the initial testing of individual identity begins. Identity is reformulated as an adaptation to context and internal changes throughout a person's lifetime, but initial identity formation occurs during adolescence because all of the factors that go into forming an identity are not present until adolescence (e.g., the ability to reason beyond the concrete operational level). Although achieving an identity is widely recognized as the primary developmental task of adolescence, there has been little empirical investigation of the relationship between contextual variables and the process of identity formation during adolescence (Kroger & Green, 1996).

Building on Erikson's legacy, James Marcia (1993) recognized that young people tend to form an inner sense of identity in different ways. Erikson suggested that identity formation "happens" in the normal course of development, but Marcia calls this a conferred identity. Marcia contrasts Erikson's conferred identity with constructed identity, in which an individual begins to make decisions about the person he or she wants to be, what beliefs to adopt, what interpersonal values to espouse, and what occupational direction to pursue. Individuals who retain a conferred identity are referred to as being in the Foreclosed status, while those who construct an identity are referred to as being in the Identity Achieved status. Those who do not seem to have a firm identity are identified as being in the Diffused status. The Moratorium status describes individuals who are in transition from no sense of identity or from a conferred to a constructed identity. Both the Foreclosed and the Identity Achieved persons have a sense of inner coherence, but only the Identity Achieved individual actually initiates and directs the process of constructing an identity.

Two crucial processes underlie identity formation during adolescence: (1) exploration and (2) commitment. Those in the Moratorium status explore, but make no active commitments. Diffused individuals initiate no real exploration nor make firm commitments. Individuals who make a firm

commitment without actively exploring are Foreclosed. Identity Achieved individuals actively explore their options and make firm commitments (Marcia, 1993). Exploration includes both exploration of oneself and the external environment. Commitment refers to making a choice that is not easily swayed and then acting on it.

Marcia's (1993) conceptualization of identity status has generated research demonstrating the positive nature of the Identity Achieved status. Several studies have found strong correlations between Identity Achieved individuals and the attributes and competencies that underlie descriptions of "skills" needed by future workers. The following are some of the studies reviewed by Alan S. Waterman (1992) in his chapter about adolescent identity formation: Positive correlations between strong identity achievement and formal operational thought were reported by Leadbetter and Dionne (1981), Rowe and Marcia (1980), and others. Null results were found by Afrifah (1980) and Berzonsky, Weiner, and Raphael (1975). Rothman (1984) observed that individuals with identity commitments were more goal-directed than those who were identity diffused. Waterman and Waterman (1974) found that males who had achieved strong identities were less impulsive and more reflective than their more diffused counterparts. Several investigators found positive relationships between identity functioning and Kohlberg's levels of moral reasoning (Hult, 1979; Leiper, 1981; Podd, 1972; Poppen, 1974; Rowe & Marcia, 1980). Only Cauble (1976) did not find a relationship. Many studies have also linked identity achievement and positive self-esteem and identity diffusion with negative self-esteem (e.g., Adams & Shea, 1979; Breuer, 1973; Marcia & Friedman, 1970). A few studies did not find a relationship (Fannin, 1979; Marcia, 1967). An internal locus of control was linked with a strong sense of personal identity by Adams and Shea (1979), Dellas and Jernigan (1990), and others. Based on Marcia's and Erikson's work and the studies formerly mentioned, Waterman (1992) suggests that identity achievement is related to optimal psychological functioning. The commissions' and studies' descriptions of "smarter workers" are, in effect, describing people who function optimally: that is, workers who are flexible, self-directed, responsible, and problem-solving; who are interested in learning more and attending to what needs to be done; and who care enough to do it well—Identity Achieved individuals.

Although Erikson's theoretical legacy stresses the dynamic interaction and adaptation between individual and context, his ideas had to be operationalized before empirical investigation could proceed productively. Tracing the antecedents of identity achievement, however, is still in its infancy. Most studies have traced the effect of family style or early attachment to significant others to later identity status. Few studies, however, have addressed the ways in which a secondary education could support adolescent identity development. This is especially important in

instances in which the family or community does not provide the necessary conditions and support for identity formation.

What secondary educational content and form offers the most promise for supporting adolescent identity achievement? Since finding an occupational direction is a key developmental task of paramount importance during adolescence, we looked at how an academic career-focused education might affect identity formation. Traditionally, secondary schools provide either specific vocational training or college preparation. Questions of equity led the schools in this study to try a new approach—an academic career-focused education that simultaneously prepares students for college and introduces them to a career field.

Working from the assumption that an environment that expects and supports identity formation will facilitate adolescent identity achievement, we constructed the following hypothesis: An academic career-focused secondary educational experience facilitates adolescent identity achievement by providing the following support for exploration and commitment:

1. *A Community of Practice:* peers, teaching staff, and counselors who recognize and encourage the young person's exploration and commitment process.
2. *Sustained, Caring Relationships with Adults:* these provide socio-emotional support and a sense of security necessary for exploration and commitment.
3. *Immersion in a Particular Occupation:* this supports experiential exploration in at least three important ways: (1) students gain a better understanding of their own needs and abilities, (2) they obtain a realistic knowledge about their chosen occupational direction, and (3) they enjoy the challenge of exploring something "different" from the usual school curriculum.
4. *Opportunities To Acquire Job-Specific Skills:* these opportunities increase students' self-efficacy and economic viability as adults in their own eyes.
5. *School-Supervised Work Experience:* this provides complex situations which require students to exhibit skills, values, dress, language, and attitudes appropriate for the workplace and the adult world. It is also an opportunity to contribute in a meaningful way.

These five contextual factors listed above are associated with positive educational outcomes scattered throughout the literature. In the educational literature, qualitative studies (Lightfoot, 1983; Metz, 1986; Peshkin, 1986; Sizer, 1984) suggest that "schools with a 'sense of community' have a positive effect on teaching and learning" (Bryk & Driscoll, 1988). Studies of Catholic schools led some researchers to argue that when a school is organized as a community it can have a significant effect on the nature of

human interactions within the school, which in turn positively affects a school's academic mission (Bryk, Lee, & Holland, 1993).

In the identity development literature, feminist critique focused attention on the importance of social context to identity formation. Prior writing emphasized doing, agency, self-awareness, mastery, values, and abstract commitment (Josselson, 1994), but feminists asserted that in order to explore, people need the security of connectedness. Exploration and commitment are, thus, greatly facilitated when a person feels the security of belonging.

Bandura (1977) defined self-efficacy as "the conviction that one can successfully execute behavior required to produce the outcomes" (p. 193). If individuals believe that they can generate responses that will result in positive outcomes, then they will perceive problems as challenges. In other words, students who believe that they can control school success and failure, that effort is important, and that they can exert it, are more likely to be engaged in school (Skinner, 1992). Motivational needs theorists Connell and Wellborn (1991) argue that social context is crucial in creating experiences of perceived control.

Recent studies suggest that complex environments are associated with the development of "higher order" competencies (Bronfenbrenner, 1986; Tulkin & Kagan, 1972). For these theorists, the interplay between the characteristics of the developing person and the environmental systems in which the person participates determines outcomes.

The Current Study

Interview questions relating to identity definition followed the format and content of Marcia's Identity Status Interview: Early and Middle Adolescence (Archer & Waterman, 1993) and the Identity Status Interview: Late Adolescence College Form (Marcia & Archer, 1993). Not all respondents were attending college at the time of the interview.

Respondents were asked to trace their occupational interest from the moment they first became aware of it to the time of the interview. Special attention was given to actions taken to implement plans and goals. In addition, interviewers asked respondents to talk about their occupational choices, requesting specific information such as education and entry requirements, advancement opportunities, salary, and responsibilities. The graduates were asked to identify influential people and experiences and what meaning they had for the graduate. Respondents were asked to project themselves into the future and describe themselves actually working in their chosen field. In addition to career development, interviewers focused on interpersonal relationships, self-efficacy, problem solving, and ethnic identity.

The author reviewed and reanalyzed each case to determine the career identity status based on the scoring criteria established by Marcia and

Archer (1993, pp. 205-240) for vocational identity. The scoring criteria are specific to late adolescents, aged 18-22, and are intended to reflect the underlying processes of identity formation: "The assumption is that genuine exploration of personally meaningful alternatives followed by selection of a general direction for one's interests and abilities is the basic indicator of identity formation" (p. 205). When the resultant identity is no longer adaptive, the person will enter another exploratory period to be followed by a new commitment. The presence, absence, and degree of exploration and commitment comprise the primary scoring considerations.

Exploration

The first dimension of the scoring system is the student's success in the exploration phase of career choice. It has two components.

- *Knowledgability of Self and Occupational Structure*
  Identity Achieved and Moratorium individuals articulate a "fairly accurate assessment of personal needs and abilities and have a realistic picture of available societal opportunities" (Marcia & Archer, 1993, p. 206). Their knowledge is more than superficial. For example, those who seriously explore alternatives have more information than can be obtained through the mass media. Those in the Identity Achieved or Moratorium statuses demonstrate both cognitive and behavioral self-initiated exploration.

- *Activity Directed Toward Gathering Information*
  Identity Achieved and Moratorium individuals give some indication that they have actively sought out experiences or information about options and alternatives. Their exploration is commensurate with interests and abilities, and they weigh and consider the consequences of alternatives. The extent, authenticity, and personal expressiveness of their exploration differentiates the Identity Achieved and Moratorium statuses from the Foreclosed and Diffused.

Commitment

The second dimension in the scoring criteria is commitment, in which knowledgability and activity revolve around a chosen occupational direction.

- *Knowledgability Related to Chosen Occupation*
  Those identified as Identity Achieved or Foreclosed talk knowledgeably about their needs, interests, and abilities as they relate to their chosen occupation. They provide at least basic information about the career or occupation to which they are committed. To Marcia and Archer (1993), knowledgability is related to articulateness. They assume that if one is

really knowledgeable about something or has given serious thought to something, then one can speak clearly about it.

- *Activity Directed Toward Implementing the Chosen Identity Element*
  Identity Achieved and Foreclosed individuals demonstrate activity that will make their plans "real." Their research found that if almost all the activity expended toward one's goal is cognitive, then the individual tends to be Moratorium. If little or no activity is evident to implement stated occupational goals, the Identity Achievement and Foreclosure status is not assigned even if the respondent states that he or she is strongly committed.

- *Emotional Tone*
  Five emotional tones tend to predominate among the identity statuses. Achievement is associated with assured self-confidence; Foreclosure with rigidity and self-righteousness; Moratorium with intensity and anxiety; and Diffusion with either breezy off-handedness or a sad, wistful, or remote quality.

- *Realistic Projection into the Future*
  Committed individuals plan for the future, and their present behavior is consistent with a particular direction.

- *Resistance To Being Swayed*
  Marcia and Archer (1993) posit three responses that indicate a high level of achievement: "(1) acknowledgment of the possibility of change, (2) linkage of possible change to the individual's abilities and societal opportunities, and (3) reluctance to change except under fairly pressing circumstances" (p. 210).

The scoring criteria were applied as rigorously as possible, and no status was determined based on a single criterion. Global identity status is reflected in several domains: vocational, ideological, relationship, sex-role values, and religion. Identity may proceed at different rates across the various domains. For example, one may demonstrate an achieved identity in the vocational domain, but not in the religious domain. Marcia and Archer (1993) assign a global identity status based on how identity is resolved in the majority of the domains (i.e. Achievement, Foreclosure, Diffusion, or Moratorium). They warn of the limitation of relying on vocational identity to establish global identity because of differential economic constraints and opportunities experienced by those in a sample. This study uses resolution of the vocational identity to indicate global identity; however, the respondents in the subsample are matched on all significant variables, including the availability of financial resources. In addition, the six hours

of interviews and the self-esteem and locus of control instruments offer insights from other domains that were considered in the final determination of status. Moreover, most observers believe that choosing an occupational direction is the major developmental task of adolescence.

Results of the Initial Interview

Not surprisingly, all of the students were quite similar on most variables, making significant findings all the more interesting. Analysis of the two-hour interview revealed significant positive outcomes among the career magnet graduates for school engagement, lifestyle choices (drugs, alcohol, and pregnancy), earned college credits, and parental support for college. There was no significant difference in the number of months employed post high school even though the career magnet graduates reported earning significantly more college credits.

The original design of the study was to compare experiences and outcomes for graduates of academic career-focused schools with graduates of traditional comprehensive schools. Unfortunately, prior to the initial interview, there was no way to identify graduates of comprehensive high schools who had attended career magnet programs within their schools. This factor has complicated the results, sometimes weakening effects, but it also offers interesting insights into the effects of stand-alone career magnets versus career magnet programs within comprehensive schools. A great many results were close to significance and, taken together, deepen the support for reported results.

Career Magnet Graduates (Stand-Alone) . . .

- cut class less often.
- had friends who were more likely to come from school than the neighborhood and to have chosen a career.
- had friends who were more likely to have ideas about a career or future work.
- consumed the same amount of alcohol at the same frequency in ninth and tenth grades, but drank significantly less and less frequently than comprehensive graduates as they progressed through high school and two years after high school.
- were more likely to have declared a college major.
- were more likely to perceive their parents as willing to sacrifice in order to send them to college.

Graduates of career magnets and comprehensive high schools were equally committed to further education; 80% of each group started college classes; however, the graduates of the career magnets and career magnet programs within the comprehensive high schools report striking differences in how they perceive their success in college.

Career Magnet Graduates (Stand-Alone and Comprehensive Career Magnet Programs) . . .

- reported earning significantly more college credits when they went to college than did the comprehensive school graduates.
- were employed the same number of months after high school graduation even though they earned significantly more college credits.

The findings from the semistructured, two-hour interview—that an academic career-focused education produces positive effects in school engagement, peer groups, lifestyle choices, parental support for college, career choice, parental support for college, and college credits earned—may seem diverse. They begin to suggest a pattern, however, if we place them within the context of normal adolescent development and supplement these findings with data from the life history interviews.

Results from the Subsample's Life History Interviews

Identity Status

Nineteen percent of the subsample of 26 students are classified as Identity Achieved. Thirty-eight percent (five students) of the career magnet sample are Identity Achieved or Moratorium compared to 15% of the comprehensive graduates (Table 6.1). Of the two respondents from the comprehensive schools who are classified as Identity Achieved, one graduated from a career magnet program within the comprehensive school; the other had an internship with a Wall Street investment bank every summer for five years which was obtained through a friend of a friend of his mother.

Table 6.1. Vocational Identity

	Career Magnet	*Magnet within Comprehensive*	*Comprehensive*
Identity Achieved	3	1	1
Moratorium	2		
Foreclosed	4	1	4
Diffused	4	1	5

This section begins with an examination of excerpts from interviews with two matched pairs to illustrate characteristics of identity status classification in this sample. We then examine the patterns of support or lack of support for identity achievement from the graduates' point of view.

Almost all of the respondents expressed a strong interest in popular and rap music and most, especially males, dreamed about having some role in the production of music or owning a music club at some time in their lives.

Many give "music" as their chosen occupational direction. The following excerpts from one interview of the first matched pair give a flavor of the exploration and commitment process characteristic of this group. JJ is the third child of a two-parent family. He is an African-American male and a comprehensive school graduate.

Exploration

JJ: Since I was little, I was always into music. I listened to the radio and it wouldn't matter what station you'd flip to. Any station I'd tell you . . . I'd tell you . . . so and so, yeah . . . 1987, 1988. I always had a knack for that. They always saying, why don't you go into music.

I: Who said that?

JJ: Like my cousin, he said, "Why don't you go into music?"

I: And how did you get interested in music as a business?

JJ: I listened to the radio, and lookin' at radios and stuff, and I know a lot of people who have talent, as in, you know a lot of talent, good talent, better than the ones I see on TV. And I think I could take these people somewhere, with the right training, if I get trained right, I could make some money out of this . . . I wanna open clubs, too. See now that's profitable. . . . My sister, she listened to R&B, she'd listen to . . . pop, she'd listen to, you know, different types of music. And I grew up into that. And I got a, I caught an ear for different music. Like I can listen to a song once and tell you, I can tell you if it's gonna hit. Or if it's gonna flop.

I: Who did you talk with about your ideas for future work?

JJ: Dave, my cousin Dave.

I: And if this career doesn't work out?

JJ: That's why I want to go in all aspects of it, cause say I'm producing, say I don't do all that well in producing, say it didn't work for me. I could always fall back on broadcasting. That doesn't work, I can fall back on engineering, fall back, that's something I wanna fall back or something so I'm in there somewhere. If not doing all I want to be, doing one definitely.

I: What about yourself has made it easier to move towards your goal?

JJ: Myself? Like my character? Like, with me, I like too much nice things. There's too much things out there I see that I like, and I want to spoil myself. I promise myself I'm gonna spoil myself, and take, if I gotta work and work and work to get the things I want, I'm gonna do it. Like . . . say I wanna pair of boots, right? Or a pair of shoes or a shirt or something like that and it costs X amount of dollars; it costs a lot. I'm a say, I'm gonna get it, I'm a go for it, I only live once, I'm gonna go for it. Why settle for less when I can get better? That's how I look at a lot of things.

I: What about your character has made it harder to get to your goal?

JJ: Sometime I get lazy. Sometimes. . . . And I'm lazy, you know. . . . Like I had a chance to . . . deejay in this club, and all I had to do was send in an audition tape, and I'm lazy—I never did it. Missed my chance . . . . I'm a get mines though; I'm not that lazy. (Laugh)

I: What are your plans for the future?

JJ: I see me still gettin' a degree. It's a two year school, so getting an associate's from there, plus all right, doin' my music. But mostly, I see like, college that's actually something to fall back on. Just in case the music stuff don't work, which I think it will. I gotta think positive. That's another thing to fall back on. But I don't want to fall back till I'm at Mickey-Dees where I've got anything like that, not that there's anything wrong, but that's just not me. . . . Well I always said that I didn't want to be poor. I want to go to college. I always used to say that. I've seen it on TV and stuff? That's what I want to be. . . . I want to get into music, that's my first love. It is music and me doin' parties all that. I wanna produce too, cause . . . I gots to know a lot a like artists that's on the street, singers, rappers. I want to produce them. That's why I'm gonna go to school and take up studio, learn tracks, and lay down tracks of my own.

I: How strongly do you feel about your plans?

JJ: How strongly do I feel? Let's put it like this. In like seven years, when you see me on the Grammy's, you see me and you say, "yeah whatever." You'll see, I'm going all the way with this.

I: And what kind of job would you most like to have right now?

JJ: I like the . . . studio, get more in touch with the studio. I plan to do that this summer. I plan to get more into my music. Instruments and everything.

I: And which would you most like to do right now, 'cause you described like four or five?

JJ: Most right now, Deejaying.

I: That's what you'd most like to do right now?

JJ: I want to go on the club level where I get like $500 every week. $500 every week. Every night I say, "What am I talking about every week?"

I: And where did you learn that this is what you wanted to do?

JJ: This what I wanted? Seeing like, going to the clubs, you know seeing them deejays. How well they do; how much clubs they play. 'Cause sometimes a deejay can play in two clubs a night. That's a thousand dollars, so that could be any where from five hundred to a thousand I make, maybe more. If you do that Friday and Saturday, whew, that's money. You don't get taxed. It's on the side.

JJ demonstrates the breezy off-handedness of the Diffused Identity status. He has not considered any alternative other than something that he did as a pastime while growing up. His knowledge of what a music producer does is primarily limited to what he has learned from going to clubs as a patron or what he has learned through the mass media. He could provide few specifics about music as a career. In other passages not quoted, he is unable to articulate his own abilities or skills. Although he is strongly committed verbally, he has taken little action to implement his occupational goals. When opportunities to advance his knowledge of the music business have come his way, he has not taken advantage of them. He has earned twelve credits in one year of college, while working in a retail store part-time. He reports making mostly "C"s in college and has not declared a major.

JJ's counterpart is CK, the only child of a two-parent African-American family. He graduated from a health career magnet majoring in dental lab technology, which he rejected as a career direction after exploring it in high school.

I: When did you think about being a pediatrician?

CK: Oh that was around the same time as dental. I knew it was something, I . . . feel I'm born to do something in the medical field. I've always felt like that. Something I had to do. I didn't know whether it was dental or pediatrics or anything like that. But I knew it was in the medical field 'cause I've tried manual labor. Manual labor is not for me. I'm just a girl at heart or something. I don't know. I don't wanna be lifting.

I: So what appeals to you about being a pediatrician though?

CK: Everything. The whole thing. Coming in contact with kids. I love kids, you know. I like, you know, like when my friends, when we used to play ball and stuff and they'd get hurt, I'm the one who's patching them up and fixing them up and stuff. When like, even now when my boy twist his ankle, I was just fixing it up for them. When I twist my ankle you know, I fix myself up. I knew how long, I felt, I felt I knew how long it was I should rest my ankle. You know, what kind of activities I felt I should be doing. How to strengthen it, you know. I just, I was always fascinated by it. Even when I watched TV, I watched [channel] 13. I was watching like open heart surgery and stuff like that. I'm just fascinated by this sort of thing.

I: So where did you come up with the notion that you can do anything if you just put your mind to it?

CK: My parents because they always say if they had the opportunity that I had, they'd be doctors. They both tell me that "I'd be a doctor" because they said they didn't have the opportunity that I have today. They had to settle . . . because they were not allowed to do what they really wanted to. They in the south. They had to work . . . because like there was a lot of them, so they had to support each other, you know what I'm saying.

I: So what if you find out, what if you don't do as well in science as you want to do?

CK: Then I'll work at it harder. Take tutoring. There's other things that I'll [do]; I'll read more. I'll study more because this is something that I feel I have to do. I don't wanna, like I said, I don't wanna do manual labor, man. I cannot . . . do it. Like every morning, I see these people on the train; they look dead. They look like zombies. You know they're doing something they don't really wanna do. You know it's like walking in a cemetery on the train. I always say that to myself. I can't do this. If you look at some of the faces, look in their eyes, they're

dead, they're hollow. I don't wanna be like. I wanna be like [grins] you know what I'm saying.

I: So I guess what I was asking is are you more motivated by your interest in the field or by . . .

CK: the manual labor side?

I: By the fact that you're not interested in that?

CK: Right. That's what motivates me and drives me.

I: That more so than the interest in the field?

CK: Right.

This interview is challenging to score because there are indications of exploration and commitment, especially in interpersonal relationships. Although CK seems to be moving toward achievement, three things in this excerpt indicate a scoring of Foreclosure: (1) he seems to be living out his parents' frustrated desire to be doctors; (2) he has not seriously considered alternatives outside direct health care; and (3) he repeatedly indicates that he feels that medicine is "something that I feel I have to do." He acknowledges that his primary motivation is fear of having to work as a manual laborer rather than an intrinsic interest in medicine. Like other Foreclosed individuals, CK is active in pursuit of his choice. He reports earning 40 college credits and plans to transfer next semester to major in pre-med.

The following matched pair is composed of two Latino males who applied to the same career magnet as eighth graders. Although they both demonstrate Identity Achievement, their exploratory paths are quite different and reflect many of the differences between an academic career-focused education and a traditional approach.

MJ, the only child of a single mother, got off to a rocky start at a stand-alone career magnet because he continued his delinquent behavior from junior high school and cut school so frequently in the ninth grade that he was still a freshman the following year. His mother was hurt and angry, and he felt disappointed in himself.

Exploration

I: What were your thoughts about your future (in the tenth grade)?

MJ: About my future . . . well, accounting sucked. I thought it was boring. I thought when I was in junior high school, I was like, "I'm gonna

major in accounting, that's gonna be my life. I'm gonna take accounting in high school and college, [and] get a job." Then in high school, I found out more about accounting. And I didn't like it, so I had to change my major. And then I got into Clerical Procedures, which is like business oriented, so I was like, "that's cool."

I: What made you decide on Clerical Procedures?

MJ: Um, everything else I didn't like. I don't . . . remember the other majors. For some reason, I didn't like the other ones. So I got into Clerical Procedures 'cause I always liked business. So like that's the main thing in business, you know, clerical procedures, business law, business management, business English. You know what I'm saying? Like stuff like that.

I: What did you think about your future work?

MJ: My future work? I know Clerical Procedures wasn't like a major in college. Ha! So I had to think about what in business I wanted to do. So then like Ms. W., she was cool about it, 'cause she let us know about all the stuff we could do in business . . . the stuff she taught us, we can apply. So, she gave us like a big outline of all this stuff we can do. And I was like, "oh, that's cool." And then one time she encouraged us to go to . . . the employment office downtown 'cause they had like some computer thing that if you type in all the stuff that you know, all your skills, all your abilities and your personality, it will give you a list of . . . all the careers you can go into. And she encouraged us to do that, and I did that. And . . . that's how I found the major that I'm in now, which is Hotel Management.

I: When did you start to become interested in hotel management?

MJ: Hotel management was like one of the majors that I chose because of my personality. I'm a person that likes to make people feel comfortable and, you know, help people out any time I can. . . . [A]nd at the same time . . . I want to make money, you know. I chose hotel 'cause I mean it does all that . . . a hotel . . . it's like hospitality. You make people feel comfortable. You try to help them out. You know, like whenever they need something in a room or something like that, you're constantly helping people. That's what I like to do. Social work, you can do the same thing, but then again . . . it's not that much money in social work. I figured if I could do that in a hotel and make the money that . . . I want to make, I can also go beyond my job and do something in the community . . . myself. I don't need my job to do that for me.

I: What do you mean go beyond and do. . . ?

MJ: Like, you know, like outside of work. I'll have my job, help people out, you know, in the hotel but that's my job. I'm doing it because I want to get paid. But then I can go beyond into my community and start up like a youth program or help out with the youth program or . . . coordinate something for like the young kids or you fix something up, you know, like a building that needs to be renovated. You know, help out that way. You know, that's not related to my job. I can do that also.

I: So, but I'm still trying to see if I can understand why hotel management?

MJ: Why hotel management?

I: And not something else? I mean, great this computer helped you out, but suppose the computer's wrong? Why still hotel management?

MJ: Well, at first it was the money and the fact that I like to help people out. Right, that fell into place. That made me choose it as a major in college. . . . So I said, well, I'll take it in college and then when I was taking it in college, I found out more about it. As I took those classes, I found out that it's something that interests me even more 'cause when you in class, they . . . detail it out for you. What parts of the hotel they are, you know, where you can do it. And, as I found out about it, I became more interested in it. I figured I wanted to do that.

MJ's exploration was somewhat constrained by being in a business-focused high school, and his current choice, hotel management, is still in the business field. Yet MJ's exploration process reflects identity achievement, because he seriously considered an alternative, accounting, and he initiated a search for an occupation that meshed with his needs and abilities. He weighed it against other possibilities such as social work, set realistic goals, and is implementing his plans effectively. Once he decided to pursue hotel management, he found a community college with that program, acquired a work-study job, made "A"s and "B"s, finished his internship, and will soon graduate with an associate's degree in hotel management. He likes his choice even better after further exploration. MJ's commitment to hotel management is congruent with his activities since graduation from high school and with his future plans. After acquiring an associate's degree, he plans to transfer to a four-year college to major in Human Resources to give himself more occupational flexibility. The following remark by MJ illustrates attitudes for which any employer would be grateful: "As a person,

I always do more than I really have to do, you know. I always think about not just myself, but who I work for. How can I make the environment better for myself and people around me?"

MJ's counterpart is BC, who was not selected by the lottery process to attend the career magnet and instead went to a small, elite high school. As a junior, he transferred to a large comprehensive high school after his family moved to a suburban area. When BC was in junior high school, his foster father died. BC was reluctant to talk with his foster mother about anything because he thought she was too preoccupied with grief about her husband and worry over BC's older sister who "was going nuts." BC was acting-out at school, even before his father died. Quotations have been combined to give the flavor of BC's exploration and commitment process:

BC: I guess, I—something always did bother me, but I could never put my finger on it. I look back now and . . . I think it was just lack of ambition, you know, lack of determination. Like I just didn't know what I wanted to do, and I think that—that was important 'cause like as the years went on, that grew. It grew a lot. . . . I figured in college I'd find something . . . . And if worse came to worse, I could always graduate and go into business, that was like my—my safety. I didn't like it all that much, you know, but it looked like you could make a lot of money. . . . I mean, at that age, it's just like money's everything. . . . I would just ask people a lot about careers. Even those guys I worked with in the upholstery shop. . . . they didn't know much about careers, but anything they said, I would listen to. So I just tried to take it all in, and I figured I'd make a decision when I'm in college, when I'd learned a lot about it. . . . When I was a freshman (Cornell), I thought about law a lot more 'cause my school was more inclined towards law. I'm in the school of industrial labor relations. I was thinking about like civil rights law or criminal. So, a prosecutor and stuff . . . and that's what I was gearing towards, but then I found out—I mean I took a—like a class in labor law, and I took a couple of other classes related to law and I was just like, law is bullshit. You know, too much red tape, too—I couldn't put up with stuff like that. So I didn't know what I wanted to do; it just like gave me more questions then. All right, so you did that, now what else is there? . . . It's the most boring, dry material that you can ever take. I took like labor history, labor law, statistics. All of that, you know, like stuff that I would never use again. And stuff that I really had no interest in. . . . And once I was here, I just hated the material they taught me. And we had writing—writing courses . . . And I liked those, and I did well in those, but those were the only ones. Everything else I didn't do so hot.

(His younger brother was seriously ill the following summer.)

BC: After my freshman year . . . he had pneumonia and . . . I don't know, he—he was really close to death, you know. My—my youngest brother Charlie, and he was eight years old. I mean, that had a really big effect on me 'cause we were close, and . . . it affected my mother too . . . . all throughout the summer . . . my mother was in the hospital everyday and I would come home from work and take care of my brothers and my little sister. I think that brought my family a lot closer together too. I felt like helpless 'cause there was nothing I could do, you know? So I thought I'd . . . I'd look into being a doctor, to medicine. But, you know, like I actually—I actually saw the value of being a doctor . . . maybe if I was a doctor, I could do something. Or if I couldn't, you know, cure them I could help treat them. Something. I felt so helpless; all I could do was like see him, hold his hand, you know? And that wasn't doing enough. I mean, you know, it would make him happy; I just wanted to do something. So I came back to school . . . I took a course in chemistry, that's one of the pre-med requirements. And I was like, "all right, you know, I can do this." I hate science, but I was like "I can do this, no problem." I did pretty well, I mean ever since then, that's what it's always been. And I mean—you know, I liked—I like the idea of being a doctor too. I liked helping people . . . it was never about like money or anything like that, just I had a chance to help them.

I: Who helped you make that decision? You said the experience with your brother?

BC: Yeah, I think that was it. . . . After that I started to ask my doctor and tell him straight, "Well, what's it like being a doctor?" . . . . I went to the (college) office, and I was like . . . "What are the requirements to go to medical school?" I looked into it myself.

I: Thinking back to the time when you decided on that career, what information did you have about that occupation, what kinds of occupations or options?

BC: Well, I guess that law was the other option that was really considered, and I wasn't really too happy with that. . . . I just liked it in principle, but not the work itself. Being a doctor, I wasn't too familiar with it, but I mean, I saw what they did. I mean, I saw what a couple of them did to my brother, you know, how they treated other patients. And I was like, "I could do this," I wanted to do it. I saw myself doing it . . . .

BC articulated commitment characteristic of an Identity Achieved status. He said that his commitment to being a doctor is "real strong. . . . Like I've never been intrinsically motivated as I am now, as much as I am now." His behavior since his decision is consistent with a strong commitment. He took a difficult science course to make sure that he could handle it and expended considerable effort to get a work-study position in a research lab. So far, he has not been successful, as the competition is stiff and positions are usually awarded to upperclassmen. He has decided to volunteer in a lab and has talked with professors and teaching assistants to set something up. His grades are congruent with his goals. He acknowledges the possibility of change but is confident that he will achieve his goal. BC has measured and weighed the consequences of his choice and recognizes the fierce competition to get into medical school. He is also aware of what he must do in order to be successful: "Learn how to work hard academically . . . like my study habits have been getting better here." Becoming a doctor is the most important thing in his life.

Career-Focused Educational Support for Adolescent Identity Development

The academic career-focused schools in this study included two business-oriented schools, one health-related school, and one high school that had a mixture of unrelated career fields—aviation, computer science, communications, and law. The career magnet that tried to incorporate unrelated fields was the least successful academic career-focused school, based on the semistructured interview and the life history interviews. If this school had not been included in the statistical analysis, the differences between comprehensive and academic career-focused graduate outcomes would have been considerably larger. We kept this career magnet in the sample primarily to obtain an adequate sample size.

Community of Practice

A particular occupational field or direction serves as the context and organizing principle for an academic career-focused school. We found that this academic career focus was the most important aspect of their educational experience to most of the graduates of the academic career-focused schools. In the initial, semistructured interview, graduates of academic career-focused schools reported cutting classes significantly less often than comprehensive school graduates. Occupational classes were named as the classes career magnet graduates were least likely to cut. Other variables support this picture of occupational programs engaging students in school. When asked why they would choose the same school if they could do it over again, career magnet graduates most frequently mentioned their occupational programs as the reason; whereas the most frequent reason given by comprehensive graduates was convenience. Two of the academic

career-focused school graduates volunteered that they would choose their same high school because teachers and students worked together for a common purpose in their school. Awareness of a common purpose did not arise from any comprehensive school graduate.

The community of practice evolves from the organizational structure of the academic career-focused school and its unique mission of simultaneous preparation for work and college. To graduate, students are required to take a minimum of credits in their chosen occupational field; they spend several hours each week during their last two years in high school learning about a field that interested them. The occupational field becomes the axis around which learning, conversation, and other activities occur. Students usually travel as a cohort from class to class, especially for their occupational classes. Most occupational classes also utilize some form of block scheduling, which offers opportunities for in-depth exploration of content. In addition, students are more likely to have a teacher more than once in an academic career-focused school because of the occupational concentration. Finally, they are required to complete some kind of internship in the academic career-focused schools, which ideally expands their community of practice to include the adult world of work outside of school. To qualify for the internships, students were required to maintain a certain grade average. Both graduates and teachers complained that not enough internships were available, so many students served internships within their own high schools.

The career orientation focuses student attention on their future occupational interests. Graduates from the Health Careers magnet recalled seeing "a lot of professional people in the school." Many students mentioned the importance of being able to talk informally on a daily basis with adults who had actually worked in the field to which they aspired. In contrast to graduates of comprehensive schools, graduates from academic career-focused schools volunteered that they talked with other students at their school on subway platforms and out of class about their occupational programs, internships, and career interests. Graduates also remarked that students dressed as if they were employed in business at academic career-focused schools. This is in contrast to one of the comprehensive schools in which the principal mandated that students had to "dress for success" certain days of the week. What the academic career-focused schools accomplished through cultural expectations had to be accomplished by mandate at a comprehensive school.

Sustained-Caring Relationships with School Adults

We asked graduates to identify the most influential adult at their schools and give us permission to interview that adult. We found that the influential adults at the academic career-focused schools were more familiar with the students who named them than their counterparts at comprehensive high

schools. As a group, they could provide more specificity about their former students. We hypothesize that the adults at the academic career-focused schools had spent more time with their former students because most were teachers who taught occupational-related subjects and had had the graduate for more than one class. The following excerpts give the flavor of the relationships between the graduates and their occupational teachers:

HI: And the teachers were very caring. . . . secretary teachers, they were like my buddies.

UK: I guess if they (business teachers) wouldn't a been behind me, and I guess they gave me confidence in myself because they knew I could do it. And if they knew I could do it, then I . . . had no choice but to believe that I could do it also. So they kinda gave me a lot of confidence. So the conversations kinda meant a lot to me. Kinda of pushed me to the right direction.

MJ: She used to have fun like all the time with us. I had her like for four classes. Like she was like the main teacher for that major. You know, so I had her for four classes. I used to talk to her like all the time, like go to her office and talk to her, in class, talk to her. She was like a friend, teacher, counselor; she was everything to us you know. She was real cool. And she was black.

EV: . . . your nursing instructor. She became like your other mother. . . . That was just another mother. She still call me to this day. Another mother. She was always just looking out, and she sensed like when you had a problem; she'd just pick it up and she'd try to work on that, whatever.

This last excerpt is especially significant because it was given by a graduate who described a particularly alienating and painful family life. She almost replicated her home experience during her first two years of high school. She was isolated and angry and cut school frequently until she entered the nursing program in the eleventh grade.

When we asked for differences between occupational and academic teachers, the most frequent difference was that the occupational teachers cared. Many students said that the occupational teachers knew what they could do and expected them to work to their potential. At least two graduates remembered that "they would go out into the halls, and hunt you down" to make sure you attended the class. There was no difference in how approachable the two kinds of teachers were, nor did graduates report any significant difference between occupational and academic instructional methodology. The difference seems to arise out of the increased

amount of time occupational teachers have with their students because they have the student for more than one class. This increases the opportunity for attachment and knowledge of one another.

Sustained-Caring Relationships with Peers

Graduates of academic career-focused schools were significantly more likely to say that their close friends were from school rather than the neighborhood. Traveling as a cohort from the start of the eleventh grade supports the development of close relationships with peers who are studying for the same career field. Many of these graduates mentioned the encouragement they received from their cohort peers. For example, a young female graduate from a secretarial program said, "you start being around more with the kids that's within your major. And so then . . . that's like when I started to really get those relationships that last the rest of my high school time."

Structured opportunities to bond with peers who are consciously preparing for a career assumes more significance in light of the common theme in the interviews of peers from the neighborhood who are "doing drugs, getting pregnant." Graduates talked about having to consciously sever relationships with former peers who were cutting school or not taking school seriously in order to meet the attendance and study time required by their academic career-focused programs.

Immersion in an Occupation

A common theme for graduates who liked math as eighth graders was going into accounting and discovering that math does not really have a lot to do with accounting. Immersion in an occupation provided the graduates with an intensive look at career fields that interested them but about which they had little prior knowledge. In the process, they not only learned more about a particular career, but they also learned more about what they liked and did not like. Most graduates did not remain committed to the career that they studied in high school, but the experience provided direction to their exploration and active practice in the process of exploration and commitment. The following excerpt is from an Identity-Achieved female graduate of a Business magnet program within a comprehensive school; it illustrates the rich environment that supports the processes of exploration and commitment:

HM: In eleventh grade, counselors were starting to call you down [to] start talking to you about colleges and your career. Then, we had a lot of business-like different corporations, like different kind of people were coming in to talk to us. Like once a week we would have different kind of people. We even had the marine people there. We had the army people there. It's like we started doing mock interviews. In

eleventh grade, we started really getting into business, all aspects of business. . . . we went on field trips. Me and a couple of girls, two other girls and guy had to go represent our school . . . corporation had sent for us to come for a luncheon, just to get an idea what's it like to work for an insurance company and different parts you could do in insurance. We went on a lot of fields. We went into courts, you know, like for court stenographers. . . . Eleventh grade was interesting . . . . Spent a lot of time in the library researching careers. . . . Greg shorthand. . . . was interesting, but I knew right then I didn't want to be a court stenographer or anything with shorthand like that.

I: Thinking back to the time you decided on a career, what information did you have about what kinds of occupations were options?

HM: At that time, I didn't know a lot. . . . I had to do a lot of research. I had to question, ask a lot of people. All I knew then [was] that I wanted to be in the business field. What part, I didn't know until I started talking with people.

Another Identity-Achieved graduate describes an immersion experience in the workplace. His internship was a turning point in his attitude about himself and marked a significant change in his efforts at school. Notice the specificity with which he describes his activities, the pride he takes in what he did, and his response to the responsibility that he was given.

I: What did you think about yourself as a learner?

MJ: I learned; I was like a quick learner. . . . Like everything I learned in Wall Street, I only had like four weeks to work there. It was an internship. It was quick. So everything I had to learn the first week, so the next three weeks I had to apply it and be on my own. . . . I learned that I was a quick learner, like we was like in the Office of Investigations. Like we investigated anything that we thought was like suspicious like . . . people selling stocks and bonds. So we had to write a report why we thought it was suspicious. So they let me do that, too. I thought they only, like, only the people that work there really do it. So they taught us how to do. And in the next three weeks, I had to do it, too. So and they taught us how to use the computer. How to look up people's background, what kind of friends they have, what kind of work they have, what kind of people they know. How to use the computer and then how to put it into a computer chrono - chronologically. You know, how we found it, what day we found it, and the activities that we took down. So all that I had to use to make

up a report. And I learned how to use it in one week. And [in] the three weeks, I did like four or five reports.

In contrast, comprehensive high school graduates from public housing or low income neighborhoods who did not concentrate on a career field expressed frustration with their isolation from usable knowledge about occupational options as in the following excerpts:

I: What did you need in ninth grade?

BC: Just direction in general. . . . people would always talk to you, "What do you want to do, what do you want to do?" They would always present options, but I don't think anybody presented like realistic options. Maybe they . . . presented realistic options to me, if they saw I was doing well, and they're like "Oh, you can be anything you want, you can be a doctor or engineer." But that . . . wasn't realistic 'cause there were no doctors or engineers in my neighborhood. . . . There were no doctors or engineers in my family . . . no lawyers—I didn't know anybody like that. And people just could not relate occupations to me; they were like "Oh, you can be anything you want to be." But I didn't have a lot of like interaction with these occupations that they were talking about, so I really didn't care for them. And I think that was another thing that was important, people finding a way to like help people with determination, but realistically. I think people have to find a way to set realistic goals for kids.

The next excerpt is from an interview with a female comprehensive school graduate, whose exploration was limited. She was unwed and pregnant at the time of the interview.

HD: I feel like if I had been exposed to more things then I would've really been . . . able to know what it is I wanted to do. But when you don't have anything to choose from, it's hard. That's why I understand how some of these out here choose to be drug dealing. They don't know anything else . . . and then plus it's . . . bringing in fast money and they're . . . like, "Oh well, I guess this is what I'm supposed to be doing." This is the kind of life I'm in, you know. I live in the projects, you know. That's how it was . . . and it was really few, very few choices. No one . . . ever introduced us to anything else. . . . And to the way we used to talk in . . . school was . . . like doctors and lawyers and stuff. That was like the highest thing to do, and oh god you probably won't be it, so don't even try it. You know, it was like that, you know. And it was like I didn't have no real desire to be a doctor anyway or a lawyer or anything like that. It just didn't seem like something kids like us

would do, you know. We . . . weren't told, oh this was like a really good profession or whatever. We weren't told anything like that. We had to just think of some things ourselves, you know.

In contrast, academic career-focused programs immerse students in a career field; this immersion offers a direction for exploration and the specific, experiential information necessary for making a commitment. The freshness or novelty of occupational courses also encourages engagement and exploration. Graduates frequently mentioned their appreciation for learning something new and different. The following graduate expressed a common theme when comparing occupational to academic courses:

HI: Maybe till eleventh grade, but yeah it got to be the same to me. Social studies, I couldn't understand how they had people who, who taught social studies because they used to teach you the same thing all the time.

I: Oh, so that's what you mean, you had the same material?

HI: Yeah, it was like the same thing. Maybe they'll add a little something new, but it was just monotonous seeing it over and over again. But like the secretarial classes, you always learned something new. Like in, when we did stenography, we didn't do it at the same pace. They would take us even higher.

Opportunities To Acquire Job-Specific Skills

The acquisition of useful job skills increases young people's sense of self-efficacy and economic viability. The graduates of career-focused programs are able to articulate the connection between what they were learning in school and its relationship to their future. We hypothesize that this awareness contributes to the lower frequency of cutting classes reported by academic career-focused graduates.

UK: I felt that (occupational classes) was more, a whole lot of important stuff. They (occupational teachers) was more stricter because they was preparing you for life.

HI: . . . people . . . say, "Oh you went to college to take up accounting. Don't you wish that you . . . went . . . for accounting instead of secretarial?" And I go, "No." I never regretted it because we gained skills that you can always use. You know, you can, you can use your secretarial skills to get through my accounting program.

Other graduates expressed the same conviction. They did not regret concentrating on a particular career field even if they abandoned it as a career choice because they gained skills and knowledge that they would use as adults. One graduate felt that her accounting skills would protect her in the future from being cheated. Others felt that they could always get a job using the skills they had learned in high school.

In contrast, students without an academic career-focused educational experience were less likely to see a connection between what they were learning in school and its relationship to their future. One comprehensive graduate stated that he did not accomplish much in high school because he did not have an occupational focus. Many graduates seemed to assume that they would just somehow almost magically acquire the needed maturity and skills required to find satisfying work. As students, their major goal was simply to graduate from high school. The following excerpt is from a comprehensive school graduate:

HD: I thought that as you got older . . . you got more mature and then you knew what it was that you wanted to do and then you had your tools to do it. You had the skills and everything by then and by the time I got . . . to the twelfth grade and I was graduating that I would just be accepted by all these different colleges and . . . everything would just fit in, and everything would go smoothly like it was supposed to. It didn't happen that way but . . . that's what I thought would happen by the time . . . I was in tenth grade first going into high school. I thought that was gonna happen. . . . like everybody just evolved into a good, intelligent, grown . . . well-spoken person once they finish high school. No and it's not true. . . . It's like, I don't know. It was like I felt real shaky about whatever I did learn in high school. You know, I didn't really feel like I knew anything.

Another male comprehensive graduate expressed a lack of focused direction another way.

I: What was the most important thing that you experienced when you were in high school?

JJ: Nothing from that school really.

I: Looking back, did your high school help you towards your goal?

JJ: It gave me a diploma. That's a part of it. I needed that to get into college.

I: Would you say that was your major goal just to get into college?

JJ: Yeah, I need a diploma to get into college. . . . I still thought I was going to college . . . I just gotta get this high school junk out [of] the way. I didn't really think. Truthfully, the way I thought all them years, "high school not important, junior high not important, college is important. College is the one . . . for the money." Mostly, I just thought school was just a place to meet people. You know, instead of just staying in the house, it's a place to meet people and, you know, and the degree, to get a job.

Graduating from high school is a great accomplishment for students from overwhelmed families beset with legacies of poverty, illness, addictions, violence, and discrimination. This was true for graduates from both types of schools, yet a greater proportion of graduates of academic career-focused programs were able to articulate a belief in their economic viability and specify what skills they gained from high school.

School-Supervised Work Experience

Both school-supervised and non-school-supervised work experience for the interviewed graduates varied greatly in quality. Some of the best work experiences, however, were internships associated with the business- and health-focused schools. The following excerpt is not typical. It represents what is possible with school-supervised work experience and is related by a graduate of a business-focused school:

I: What was important to you about that job?

MJ: Important to me, like usually, like I expected the people at the job to be looking over me every time. Every time I came to work to be looking over me and be like, "do this, do that." But the first week, they did that cause they were teaching us how to do it. How to do the work. Then the next three weeks, we didn't get that. So that was important 'cause I learned how to be independent. I learned how to even though I would have liked them to be there over me 'cause I was nervous. Like it really mattered what I did, you know. But it taught me that I had to do things for myself. Like use the stuff that I learned and get it in my head so I could use it for myself. So it was important 'cause I got to be like more independent and utilize everything that I learned real quick.

Discussion

The life history interviews provide insight into how an academic career-focused educational structure supports the processes of exploration and commitment that underlie adolescent identity formation. The daily

experience of students in school is as important as the instruction that they receive. When implemented well, the organization and structure of the academic career-focused school or program support a community of practice and offer complex new challenges that meaningfully engage students. The school-to-work program immerses students in preparing for and learning about something in which they had expressed interest. They bump up against expectations and realities in the world outside their homes and school in a nonconsumer role. The academic career focus implies an expectation of planfulness from the students and an expectation that the students will be active in pursuit of their commitments. In the process, the students learn more about themselves, particularly what they like and do not like to do in relation to future work. They also learn more about their own needs, values, and interests, which is critical information for guiding their future decisions. If they are lucky enough to be in a good program and get an internship, they also learn more about what the larger world is like and expects from them. Students can more easily picture themselves as part of that larger world if they have been actively engaged in it as participant producers, "seeing what it is really like." Their exploration and commitment during high school support differentiation from parents, while offering the security of still being part of a close-knit group.

Is academic career focus just a motivational hook to keep students in school, or does it have intrinsic value? The results of this study indicate that academic career-focused education serves as more than merely a "hook" to engage students or a way to get students work-ready. School-to-work may be a particularly helpful avenue for practicing exploration and commitment because it is connected with the adult world and assists young people to work on a primary developmental task of adolescence—finding a life's work.

Although the findings from this study yielded significant results, not all of the academic career-focused schools or career magnet programs within comprehensive schools were successful in their graduates' eyes. One of the four academic career-focused schools received many negative reviews. Even those who were positive about their particular occupational program were not very positive about the school as a whole. This school differed from the other academic career-focused schools because of its combination of unrelated career fields and an emphasis on curricular integration in, at most, only two programs. The graduates' primary criticisms of this school were uncaring, unknowledgable teachers and too much academic content in courses from which they expected more occupational information and skills. It is indicative of the strength of academic career-focused education that significant findings in outcomes between academic career-focused and comprehensive high schools were still obtained despite this school's inclusion.

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CHAPTER 7

Conclusions

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In this last chapter, why our randomized experiment found both the negative and positive effects of these career magnets will be discussed. The successes will be looked at first, and then the failures.

Explaining Success: The Role of Careers in Adolescent Development

To a much greater extent than their comprehensive school counterparts, career magnet alumni say that their parents will support them for college. In addition, they take more college courses, earn higher wages, and rein in the seemingly inevitable companion of adolescence—reckless behavior. At age 20, the alumni of career magnets report that they smoke less, drink less, study and work more, and generally take themselves and their lives more seriously and more confidently than the alumni of comprehensive schools. These striking positive outcomes of career magnets show the great power that high schools have to alter the development of adolescents and even affect their families.

If one views not attending college, or not taking it seriously and not doing a good job of accumulating college credits, as deviant behavior, then the Magnet Model appears to combat that sort of deviance as effectively as it reduces alcohol use. In adolescent development, deviance is in large measure a response to one's failure to successfully accomplish the developmental tasks of adolescence. Career magnet programs, by providing hope and support, make those developmental tasks easier to accomplish.

The presence of an academic career focus seems to create a setting where students can be provided the support they need to build an occupational identity. In Chapter 6, Anna Allen conducted her analysis within the framework of the literature on adolescent development, which focused particularly on the formation of identity. In Allen's analysis of the life history interviews, career magnet students are much more likely to have moved through the indecision of adolescence to establishing a career identity. It seems likely that faith in their own competence, plus their belief that they have successfully chosen a career, explains their higher rate of college success. If so, low-income youth may especially benefit.

The adolescents in the schools we studied have good reason to be pessimistic. They do not have family businesses or connections, and they have little knowledge of what good jobs might be available. For these

students, the distinction between "job" and "career" is of great importance. Many of these students believe that their only hope is to live a life considerably different from their parents, and in a considerably different neighborhood. The job at the corner grocery store, or even a steady job at working class wages, will not change their life. College and an opportunity in business or health care may give them the chance they need.

In contrast, the comprehensive high schools attended by students in this study still seem to resemble the high schools described in Cusick (1973), and in Wiseman's (1968) documentary, "High School." There seems to be little about these traditional comprehensive high schools that prepare students for adulthood, and nothing that deals with their fears about the future. Adolescents have reason to be fearful—their own adulthood is a risky, unknown territory.

A good career magnet will also be a warm environment. As it attempts to provide good career preparation, it will almost instinctively create a supportive environment, and for most teachers, creating that sort of environment for students will be highly satisfying. Allen concludes that "a network of sustained caring relationships, high expectations, and opportunities to develop and use workplace competencies were common to all Identity Achieved and Moratorium graduates."

Allen's findings, based on an extensive analysis of a small sample, help us understand the statistical analysis of the larger samples. For adolescents, developing a career goal is an important part of creating an identity, and the career magnets give students an identity that serves as a foundation to support their relationship to their school. Their career identity may also be the basis of their avoidance of adolescent escapism in drinking, smoking, and other risky behavior. It may give them the commitment to approach their parents about college funding, and the self-control that would encourage their parents to invest in their future.

One valuable point of departure are two near-classic books by Philip Cusick (1973, 1983). In the first, he argues that the high school is designed to reward scholarship. However, since most students will not be rewarded as scholars, the school provides an alternative reward system to attract the loyalty of a second group of students, which is made up of inter-school athletics and the fraternity/sorority-like social whirl of service clubs and student government. This system leaves out most students: those who are neither "brains" nor "popular." If it seems surprising that career magnets can be so effective, the root of our surprise may reside in our failure to recognize the hiatus-from-development model of today's conventional high schools.

High schools are the only large educational institution serving adolescents or adults that are not primarily vocational in purpose. The high school has taken a more academic view of its mission than has higher education and seems to be failing at this mission. As the number of students intending to graduate from high school has increased dramatically, the

mission has also come to seem inappropriate. The high school is only college preparatory for some, and it is under pressure to raise its academic standards to meet the escalating standards for college admission. It provides vocational education to others, but the high-paying skilled crafts jobs are disappearing in the United States, and the technical training required for many jobs has increased beyond what the high school can do. The argument is made that all students need an academic education because of the increasing demands for cognitive skills at all levels of industry; however, for the past several decades, a lot of students have not responded to that message. Abstract academic education not connected to a specific career—even when coupled with a happy experience participating in an adolescent society of sports, performing arts, dances, and dates—can be satisfying only to those students who are certain they will get a four-year college degree that will meet their career-preparation needs. For the rest, whose future looks uncertain and remote, the school can seem irrelevant and a waste of precious years.

In Cusick's later book, *The Egalitarian Ideal in the American High School* (1983), he argues that the school that wants to reduce its dropout rate will often try to reach this alienated majority by easing academic pressure and being "friends" with students. Cusick tells an anecdote, no doubt horrifying to many of his readers, of the dean who calls a student in because of her poor performance and winds up admiring pictures of her new baby. Contrasted with this traditional kind of high school, the career magnet could honestly command the loyalty of its students and legitimate the authority of its faculty by offering students an opening to a future career that does not require them to be part of the academic, athletic, or social elite.

The Design of Career Magnet Programs and Students' Experience of High School

Unfortunately, in many career magnet programs, that goal is not achieved for all students, and perhaps not even pursued. Even the most successful programs do not create the Waldorf-school-like closeness between teacher and student; and Sullivan and Little, in Chapter 4, have convincingly shown that even successful students did not receive the care and attention we might expect. Sullivan and Little ask a simple question: "What do lottery-winning students really experience in their career magnet programs?" Their analysis documents considerable implementation failure: The career magnet programs seem to fail as often as they succeed; they often do not create a strong sense of community or a coherent academic-career program; and students report being admitted into a career magnet program only to find no program when they get there. Had the sample included high school dropouts, it is possible that we would have found even more poor-quality programs.

In some respects, this is encouraging, since it suggests that one need not demand dramatic change in teacher-student relations or in the behavior of

teachers generally. What does matter is persuading students that they have a real opportunity to enter a career. Career magnet programs do this by providing students with skills that they recognize as valuable and by telling them directly that the opportunities are there. The internships and jobs close the deal by giving them experience in a work setting so the formerly remote and distant occupation can become familiar.

Nonetheless, the question raised by Sullivan and Little is serious: "When is a career magnet merely 'false advertising'?" as one assistant principal described these career magnets. Obviously, they were not all "false advertising"; the research found a number of programs that fit the definition of a career magnet. Furthermore, the overall positive effects of the career magnets make it clear that some students received something special. But the question is, "Which students?" After Sullivan and Little completed their analysis, we went back into the field to try and learn when a program existed only on paper. We found that the programs were always "real" but did not necessarily include all the students who were supposed to be in them. In other instances, we found that the program was somehow split so that some students got the full benefits of the career magnet experience and others got less.

One explanation is that programs designed to integrate academic and career teaching are difficult to create and maintain because they run contrary to the culture of high schools. A high school teacher's community is partly in the department, which is invariably discipline-based. There is no reason to expect those identities and communities to fall apart, to be instantly replaced by an integrated academic career focus. It can happen, but it will require considerable effort.

A second explanation is a shortage of money. It may be that some students are not offered the program they are supposed to receive because there is not enough money to go around. We do not know whether the educational benefits to all students would be greater if resources were shared equally; however, even if there were reason to believe that equal allocation of resources would in the long run be optimal, unequal allocation will continue unless schools are tightly regulated. Educators take pride in running good programs, and most would find much more satisfaction in creating a very good program for a select group than in providing an average education for a much larger number. There is little prestige attached to teaching high school, and, after enough years, there is more boredom than stimulation. Lortie (1975) observes that every older male high school teacher he interviewed had either a second job or a demanding hobby. For some of the program staff we interviewed, the program was their demanding and rewarding second job, where they could administer, organize, meet with business clients, and attend professional meetings. Even so, these teachers could receive these rewards only by teaching strong students who can hold internships with high-status employers.

This points out a major risk with magnet programs in that their reputations may be based not so much on their true successes but, rather, on their ability to attract good students whose success would make the program look good even if they did not really receive a better education. Their high student performance will usually allow magnets to escape close scrutiny. This cuts both ways: Just as some problems of these magnets go unnoticed, so do some of their remarkable successes. The result is unfortunate; we are unable to press for improvements where they are needed, and unable to learn from the accomplishments of these programs.

The results of this study must be considered in the light of another unexpected finding. While the research showed that career magnets that made heavy use of computers saw gains in achievement test scores of considerable magnitude, that was the exception. In general, the career magnet's test scores were slightly lower than those in the comprehensive schools. For decades, educational research has been driven by a single-minded belief that the sole function of the school is to raise test scores. In fact, this study convinces us that the primary goal of the school should be to prepare adolescents to succeed in adult work and higher education. The schools that did this well did so without raising test scores. This research has convinced us that test scores are over-rated as a measure of the quality of education. Our conclusion—that test scores were not markedly lower in the career magnets—should reassure educators who feared that introducing a new focus into high school would create an achievement decline.

Implementing Career Magnets: The Easy Part

The other encouraging finding from this analysis is that the benefits that occurred did so without much change inside the classroom and no radical change in the overall structure of the school. The three successful schools whose graduates we surveyed were well-run, older, well-established schools with a history of good leadership. All three had attracted good teachers and had created a commitment among its staff to the school's academic career focus. The study found little integration of careers with the academic classroom, however, and not much evidence that academic material was incorporated in their career preparation. The programs were successful without even being exempted from district rules regarding teacher recruitment.

For policymakers, this suggests that effective school-to-work programs can be created for at least some students without subjecting the high school to the more radical surgery suggested by advocates of privatization of schools, vouchers, charter schools, or apprenticeship models. The Magnet Model described in this study as a type of school-to-work for the college-bound may be the most practical answer we have today.

Implementing Career Magnets: The Hard Part

However valuable the integration of academic and career work—and there is a large body of literature that demonstrates the value—integration occurred almost nowhere in the schools we studied, and the likelihood of it happening on a large scale seems small. We see little evidence of integration in programs that have been running for as long as two decades.

It is also clear from this research that bringing careers into the high school will not automatically raise the graduation rate. Both employers and colleges want only the best students, so there will always be pressure on the schools to devote their resources to high-level training for a minority of students. Since local and state educational authorities have not paid attention to the graduation rate in these programs, it should not surprise us that their dropout rate is high. This does not mean that this is an insoluble problem; there are career magnets with low dropout rates. We think the problem is one of politics and oversight. Higher graduation rates might mean that these high schools will be training some students who at the end of four (or five or six) years may still be unqualified for entry-level work; yet, providing an integrated education may be a better answer than putting them on the street as dropouts.

The low graduation rate is a troubling finding. Much of our study dealt only with graduates, and only a minority had graduated five years after entry. Of the graduates, perhaps only half of the supposed career magnet students had been in a program that would meet a reasonable standard of what a career magnet program should be. How should we interpret the coexistence of what appears to be success from one point of view with what is clearly failure from another? There are two plausible hypotheses:

1. *Career magnets will succeed, but only when they have good students.*
   To achieve the career magnet goals and, at the same time, maintain good relations with employers to find placements for graduates and interns, schools will decide that they must jettison their weakest students. The school will not want to waste resources on maintaining even a second-class program for them. This seems to be a "natural" outcome of the career magnet system because there are a variety of social factors that press decisionmakers to act, consciously or unconsciously, so as to preserve the system. The programs we studied had inadequate resources; given the circumstances, they weeded out weaker students and directed school resources to the remainder.

2. *Career magnets can succeed, and do.*
   Many program administrators, and teachers as well, seem to believe that the way to make the career magnet succeed is to operate the program at a lower standard. The stronger students get a fairly good career magnet

experience; the weaker students get a second-class program, one that is not much different from the comprehensive schools. Most (or perhaps all) districts have weak controls on program quality. If a district does not have systems in place to push schools to maintain higher standards, there will be some program failures. No school reform can survive poor implementation.

Based on field visits, readings of the data, and contacts with higher-level administrators, we are inclined to say that both hypotheses are right. Other studies have tended to focus on exceptional schools, and we have done that here in part of our study; however, we have also studied schools and programs within schools that are clearly not exceptional, and even in the exceptional ones, our interviews with a random sample of students give us insights that other studies do not often get.

School districts that wish to create exceptional programs, or use this model of career magnet education, will need to use outcome-based evaluation and take administrative action to correct the kinds of program failures we have found. There are good reasons why these failures occurred and why one would expect these kinds of failures in every school district trying to apply this model. Research in this area frequently points out the problems caused by central office bureaucracies that limit building-level initiative; however, the research presented here indicates that we also need to be concerned about governance that fails to prevent local administrators from letting programs fall apart, or that discards some students in order to serve others better.

Reading our data in this way, we conclude that the career magnet programs we studied are a promising model. They are inexpensive; they are attractive to both students and teachers; and if implementation is moderately well done, they have high payoffs for many students. Effective implementation is not automatic, however.

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APPENDIX A

Additional Notes on the Methodology

We described this study as an experiment-based or random assignment-based research project because its basis is the random separation of lottery winners from lottery losers in the eighth grade before the students enter high school. In all the research, we compare lottery winners to lottery losers, letting the difference between the two groups be our best answer to the question, "Do career magnet students receive a better education than they would get in a comprehensive school?" Merely being a lottery winner or lottery loser does not guarantee that the student will attend or graduate from a career magnet program or a comprehensive school, however.

The lottery plays an important role in removing many of the unmeasurable effects of family background and school experiences before the end of eighth grade. By comparing students who won and lost the lottery after applying to the same career magnet school, we also control all the students' aspirations and interests as of the end of eighth grade. We strengthen the match on attitudes by using as our pool only those students who applied to a career magnet school as their first high school choice. (The lottery always gives preference to a student who gave the school as a first choice over one who gave it as a later choice.) The decisions students made after that, however, do introduce biases.

The first student decision is whether to remain in the public schools after receiving word of their high school admission. Lottery losers who are not school-selected are, not surprisingly, slightly more likely to leave the public schools to attend private schools. Some of them move out of the district or use a false address to attend a more prestigious public school in the area outside that served by the career magnets. (There may also be a small number of eighth graders who elect not to go to high school at all, but this would be illegal for all but those who are considerably overage.) Since the students who are able to attend private schools presumably receive a better education than they would in public comprehensive schools, retaining these students in the study and using them along with all the other lottery losers to estimate the quality of education in comprehensive schools tends to overestimate that quality and make the career magnet schools' performance look worse than it actually is. Fortunately, this bias is relatively small because not very many students leave the public schools.

Secondly, students may stay in the public schools but not go to the school the lottery result dictated. Lottery-winning students have the option of declining admission to the career magnet school; lottery losers can

sometimes get an offer from the school when the school reviews the list of those who lost the lottery. (Students are not informed whether their admission is because of school selection or because of lottery selection, so there is no "Hawthorne Effect" introduced.) As Appendix B describes in detail, about 30% of lottery losers are able to attend a career magnet school, while about 20% of the lottery winners choose not to attend their first-choice career magnet school. In our analyses of the effects of the career magnet schools on dropout rates and achievement test scores, we compare all lottery winners to all lottery losers, so that we do not introduce any bias due to student self-selection. In doing so, we underestimate the difference between the effects of the career magnets and the comprehensive schools, but not so much as to bias the result by changing the direction of the difference. It could only create a false direction if, for example, lottery losers who attended comprehensive schools got a fine education, but those who chose career magnets chose only career magnets with very poor quality, thereby making the lottery-losing pool have worse outcomes than the lottery winners and letting us falsely attribute this to the lack of quality of the comprehensive schools. We think this highly unlikely, since, in many cases, the lottery losers who attend career magnet schools are probably attending career magnet schools of about the same quality as the career magnet schools attended by lottery winners. (Indeed, in many cases, these students will receive an offer from their first choice school, the same one for which they lost the lottery admission). The lottery winners and lottery losers are equally likely to attend highly selective academic schools, which in this area are very prestigious, so that most lottery winners would elect those schools over their career magnet first choice. (The academic career magnets do not use lottery admission.) These assumptions correspond to setting these effects to zero in a structural-equation modeling of this process.

Appendix B considers the issue of bias introduced at this stage and concludes that there is no strong reason to believe that these decisions bias the data in favor of or against the career magnet schools; it also concludes that the measured difference between lottery winners and lottery losers is considerably less than it would be in an experiment in which every lottery winner was required to attend a career magnet school and every lottery loser required to attend a comprehensive school. Where lottery winners perform better (or worse) than lottery losers, we believe that this difference means that career magnets are providing a better (or worse) quality of education, and the actual difference in quality, whether positive or negative, is probably twice as large as the difference between all lottery winners and all lottery losers. For example, the positive impact of career magnets on college credits earned is probably twice as large as it appears to be in Table 5.4, and the negative impact on graduation rates due to attending a career magnet school is probably also twice as large as what we found.

Another self-selection bias appears when we study graduates of the program; since the career magnets have a lower graduation rate, we would expect a random sample of career magnet graduates to have better postgraduate outcomes than graduates of comprehensive schools. We attempted to minimize this difference by drawing a sample of matched pairs, matching the students on eighth grade achievement test scores and other factors. Some of the differences in the performance after graduation of career magnet and comprehensive graduates are much too large to be explained away by any possible bias due to the lower graduation rate from career magnet schools.

The Survey Design

A survey of 110 career magnet school graduates was conducted according to a careful matching plan designed to ensure that the random assignment used to either select or reject students from a particular program was maintained. At the time of selection into the survey study, each potential interviewee had to have graduated from high school within the previous two years; to have scored in the mid-range on reading tests; and to have been enrolled in high school in regular classes, with no special education placement. Lottery winners and losers were matched on their first choice of high school, on age, and on seventh- and eighth-grade school performance. Although we hoped to match interview pairs on the junior high school attended, we were unable to do so. Nor were we able to obtain an even balance of 110 graduates based on gender. There were two reasons for this. First, 60% of our original cohort of 9,174 students were female. Secondly, two of the four career magnet high schools from which we drew the sample of graduates to be surveyed had predominantly female enrollments. Consequently, we had to oversample males from the other two career magnet programs. Nonetheless, our final sample was still overwhelmingly female (72% to 38%). The race/ethnicity of the lottery winners and lottery losers were closely balanced.

Because of confidentiality requirements, initial contact with a pool of potential interviewees for the graduate survey had to be conducted through letters sent by counselors from their high school asking if they might be willing to participate in the interview. Interviewees were paid $40 for their participation, which generally lasted between two and three hours. Interviews were conducted from May 1993 through May 1994. In most cases, interviewees were living in the general area. These interviewees were given the option of either coming to the college for their interview session or having a project interviewer meet them at their home to conduct the interview. In most cases, interviews were conducted at the college; in some cases, interviews were conducted when college students living away from home returned for vacation; and, in a few instances, project interviewers

were dispatched to colleges outside the area to conduct interviews with graduates unable to return.

In nearly all cases, interviews were conducted by interviewers who matched the interviewee on race or ethnicity, age, and gender.

APPENDIX B

Using the Experimental Results To Estimate the Impact of Career Magnets on Students

We have seen that a randomly selected group of students who were offered admission to career magnet schools had generally different educational outcomes than did another randomly selected group of students who were not offered admission by the lottery process. Since the two groups were identical (disregarding sampling error), except that one group was more likely to attend a career magnet school, it follows that the differing outcomes must have been caused by the career magnet schools. So much is obvious. There are two less obvious questions, however: (1) How large is the effect of the career magnet program on the average student? and (2) To what population of students can these results be generalized?

To make the experimental design work, it was necessary to compare everyone who was randomly admitted to career magnets to everyone who was randomly passed over. If every student who had won the lottery had attended a career magnet school, and every student who lost the lottery had attended a comprehensive school, then the difference in educational outcomes between the lottery winners and lottery losers would be exactly equal to the difference in the school effect of attending a career magnet rather than a comprehensive school. Unfortunately, in comparing lottery winners to lottery losers, we are not just comparing students who were in career magnets to students who were not because some lottery winners chose not to attend career magnets, and many lottery losers found other ways to gain entrance to career magnets or other selective schools. This means that the experimental design will in all probability underestimate the effect of the career magnets. The task of this appendix is to calculate the size of this underestimation. We can do that by writing an equation that decomposes the difference between the experimental "treatment group" (the lottery winners) and the "control group" (the lottery losers) into the school effects of the different kinds of schools the students in the experiment attended.

Knowing how many students are in each type of program and the overall difference in the performance of lottery winners and lottery losers, we divide students into subgroups and estimate the difference between lottery winners and lottery losers for each subgroup. There are seven subgroups; they are constructed from Table B.1, and are shown in Table B.2.

Table B.1 allows us to divide the population of career magnet applicants into the seven separate subgroups in Table B.2, based upon whether they won or lost their lottery and what schools they attended. We do this in order to see which of these seven subgroups received differing treatments as a result of winning or losing the lottery (i.e., went to different types of schools) and, thus, contributed to the difference in student outcomes that we found. The point of this exercise is to identify subgroups of students who, in fact, wound up going to the same types of schools whether they won the lottery or not, since these students cannot have different outcomes as a result of winning the lottery, and, hence, are only "dead weight" in the experiment. The subgroup code numbers refer to rows in Table B.2.

Subgroup 1:

First, note that 30% of the lottery losers enrolled in a career magnet. Most of these were selected by a program, with only a few winning another lottery. Since the lottery losers are a random sample of all applicants, and the lottery winners are also a random sample of all applicants, it follows that among the lottery winners, there is a statistically identical group of students (making up 30% of all lottery winners) who, had they lost the lottery, would still have enrolled in a career magnet school (although not necessarily the same one). This 30% are presumably students with good grades and attendance records. Let us refer to this 30% as "certain career magnet students."

Subgroups 2, 4, and 6:

Note also that among the lottery winners, 2.1%, 2.7%, and 14.3% chose to attend selective vocational schools, academic or art schools, and comprehensive schools, respectively. These same types of students are represented in the lottery loser group and surely would have made the same decision to attend these schools, since not offering them a choice that they would have turned down could not possibly change their decision. Let us call these three groups "vocational," "certain selective," and "comprehensive students."

Together, these four groups make up a total of 49% of all lottery winners and, of course, make up 49% of all lottery losers as well (ignoring sampling error), since both groups are random samples from the same population. The type of school these 49% attend is unaffected by the lottery because they would have made exactly the same decision as to type of school whether they won the lottery or lost it. The remaining 51% were affected by the outcome of the lottery: winning or losing the lottery caused them to change the type of school they enrolled in.

Subgroup 3:

Note in Table B.1 that whereas only 2.1% of lottery winners attended selective academic or art schools, 4.1% of lottery losers did this. Apparently the extra 2.0% (4.1-2.1) of lottery losers in selective schools are there only because they lost the lottery, the selective schools were their back-up choices. Since the lottery winners are identical within sampling error to lottery losers, this implies that 2.0% of lottery winners were offered seats in selective schools, but turned them down after winning the lottery. In other words, there is a group of lottery losers and a matched group of lottery winners, making up 2.0% of each group, who would attend a career magnet if they won the lottery and would attend a selective school if they lost the lottery. Let us call this group "changing selective students."

Table B.1. Final Destinations of Lottery Winners and Losers

Final Destination	*Lottery Winners*	*Lottery Losers*
Career magnet schools	35.4	8.8
Career magnet programs in comprehensive or vocational schools	45.0	21.2
Subtotal	**80.4%**	**30.0%**
Selective academic or art schools (Subtotal)	**2.1%**	**4.1%**
Vocational schools	2.7	8.3
Comprehensive schools	14.3	57.0
Subtotal	**17.0%**	**65.3%**
Total	*99.5%*	*99.4%*
N	(1,304)	(3,734)

Subgroup 5:

Similarly, we see that whereas 8.3% of lottery losers attended vocational schools, only 2.7% of lottery winners did so. This implies that 5.6% (8.3-2.7) of lottery losers would have preferred the career magnet program they applied to over the vocational school which accepted them. Thus, we have identified a subgroup, making up 5.6% of both lottery winners and lottery losers, who would choose a career magnet if they won the lottery and a vocational school if they lost the lottery. Let us call this subgroup "changing vocational students."

Subgroup 7:

Since 57% of lottery losers are attending comprehensive schools, but only 14.3% of lottery winners are attending comprehensive schools, it follows that 42.7% of the lottery winners would have wound up in comprehensive schools had they not won the lottery, and these 42.7% must

be statistically identical to a subgroup of the same size of lottery losers who are in comprehensive schools. Let us call this group "changing comprehensive students"; it is this group whom we are most interested in because the experiment is designed to compare the educational outcomes of the members of this subgroup who won the lottery and went to career magnets to those who lost the lottery and went to comprehensive schools.

Table B.2. Separation of School Effects on Experimental Students

Group Name	*If Lottery Lost*		*If Lottery Won*		%
	School Attended	*Imp*	*School Attended*	*Imp*	
Certain career magnet	Career magnet	a	Career magnet	B	30.0
Certain selective	Selective	u	Selective	U	2.1
Changing selective	Selective	v	Career magnet	C	2.0
Certain vocational	Vocational	w	Vocational	W	2.7
Changing vocational	Vocational	x	Career magnet	D	5.6
Certain comprehensive	Comprehensive	y	Comprehensive	Y	14.3
Changing comprehensive	Comprehensive	z	Career magnet	E	42.7

Taken together, these seven subgroups make up 100% of the lottery winners and 100% of the lottery losers. We list for each group in Table B.2 a coefficient ("imp") which measures the impact of the type of school they attended on some unspecified outcome, a, b, . . . e for each subgroup which experienced career magnet education and u . . . z for those who experienced some other type of schooling. Since each subgroup is made up of different students, it is possible that the impact of a career magnet would be different for each subgroup.

The impact of a school may be different for different types of students; a career magnet may have effect "e" on a student who would have gone to a comprehensive school if they had not won the lottery, and an effect "d" on a more vocationally oriented student who would have entered a vocational school if he had not won the lottery. We also assume that in some rows of the table, the lottery outcome would make no difference in a student's educational outcome. For example, the same school effect coefficient, "y," appears in both the third and fifth column of the sixth row. For a student who applied to a career magnet, but whose first choice really was their comprehensive school (certain comprehensive), we assume that the honor of being offered a seat at a career magnet might engender a temporary feeling of pride, but this would not be a powerful enough emotion to affect their ninth-grade performance at their comprehensive school.

If "X" is the measured educational outcome of lottery winners and "Y" the outcome of lottery losers, then changing the percentage distribution to decimals and summing up the effects in Table B.2 gives us equations (1) and (2):

(1) X = .300b + .021u + .027c + .027 w + .056d + .143y + .427e

(2) Y = .300a + .021u + .020v + .027w + .056x + .143y + .427z

The experimental difference between lottery winners and lottery losers is then, after canceling identical terms,

(3) X - Y = .300 (b-a) + .020 (c-v) + .056 (d-x) + .427 (e-z)

(For this analysis, we assume that coefficients measure the effect of attending a given school, and that the effect of being selected but not attending is zero.)

The goal of this study is to estimate (e-z), the effect of attending a career magnet versus attending a comprehensive school. In order to estimate (e-z), we must make assumptions about the size of the other coefficients.

As a first step, we asked what the most plausible set of assumptions might be. We assumed that the difference in the educational outcomes among lottery winning and lottery losing certain career magnet students (b-a) would probably be small relative to some of the other terms. The certain career magnet students who lost the lottery are highly likely to have been school selected by their first-choice career magnet schools, the same schools they would have attended had they won the lottery. Since they would not know whether they were school selected or randomly selected, there cannot be any differential effect. The only effect would be for the students who were school selected or lottery selected by their second or less-desired choice but who, had they won the lottery, would have gotten into their first choice. The effects of the educational quality of these second-choice career magnet schools versus the first-choice schools would mostly cancel out (since one person's first choice is another person's second). For a portion of the 30%, there would be a motivational effect of not getting one's first choice, but we are inclined to assume that this effect is relatively small.

Examining the rest of equation (1), we were inclined to assume that for academically oriented students, the effect of being in a selective school, "v," is not much different from being in a career magnet, "c"; however, the effect of being in a vocational school, "x," would be considerably less than the effect of being in a career magnet, "d." Conversely, for students with a strong academic career focus, being in a selective school may be much less beneficial than being in a career magnet, while being in a vocational school may not represent a great loss. We still would assume, however, that

students would not improve their educational outcomes as much in a vocational school.

It seems quite reasonable to assume that comprehensive schools are educationally weaker than selective schools and probably do not motivate students the way a vocational school does. Thus, it is safe to assume that the differences (b-a), (c-v), and (d-x) are all smaller than (e-z).

In examining the assumptions we made, we saw that they split the difference between two extremes. At one extreme is the assumption that being in one's first choice career magnet means a much better educational outcome than being in any other kind of school, even a selective academic school. At the other extreme was the assumption that getting into any sort of career magnet school, even a vocational school, had an equally positive effect. Thus, we decided to algebraically estimate the implications of both extreme assumptions.

If we assume, first, that career magnets are not better than either selective or vocational schools, and attending one's second (or less desired) choice career magnet is not harmful, then in equation (1) the terms (b-a), (c-v), and (d-x) would all become 0, and equation (3) would simplify to become equation (4):

(4) X - Y = .427 (e-z)

At the other extreme, we can assume that being randomly selected into almost always one's first-choice career magnet program is superior to attending either a selective, vocational, or comprehensive school, or even one's second-choice career magnet school. We assume the benefit over all these other types of schools is the same; we also assume that one-third of the career magnet students who lose the lottery do not get into their first-choice career magnet. If so, then in equation (3) we can set (b-a) = (c-v) = (d-x) = (e-z), and change the coefficient .300 to .100. Then the experimental effect found in the experiment would be given by equation (5):

(5) X - Y = (.100 + .020 + .056 + .427) (e-z) = .603 (e-z)

Perhaps the most reasonable thing to do is to split the difference. Let us assume X - Y = approximately .5 (e-z), and our conclusion is that the effect found in the experiment, X - Y, is about half the size of the effect on a student of being in a career magnet program instead of a comprehensive school.

It is important to look at the ratio of the rate of growth in career magnet schools to the rate of growth in comprehensive schools. If X represents the performance of lottery winners, Y represents the performance of lottery losers, "M" represents the effect of attending a career magnet, and "N" represents the effect of attending a neighborhood comprehensive school, and we assume (based on B.1) that 80% of lottery winners experience

educational benefits like those received from a career magnet education while only 30% of lottery losers do, then the educational effects on lottery winners and lottery losers are as follow:

$$(6)\ X = .8M + .2N$$

$$(7)\ Y = .3M + .7N$$

Solving these two equations for M and N, we conclude that the true ratio of the effect of career magnet schools, M, to the effect of comprehensive schools, N, is

$$(8)\ M = .7X - .2Y$$

$$N \quad .8Y - .3X$$

This equation implies that if lottery winners have outcomes 25% higher than lottery losers, then we should expect students in career magnets to have outcomes approximately 60% higher than students in comprehensive schools. If the lottery winners have scores 50% higher than those of lottery losers, we should expect students in career magnets to have outcomes about two-and-one-half times greater than students in comprehensive schools.

This analysis has also answered our second question: To what population can we generalize our results? The particular group of students for whom we can estimate effects are only those whose effects are e and z. Any attempt to solve equation (3) for any of the other school effects would require making very extreme assumptions, including assuming the size of coefficients e and z. The only reasonable assumption is that any difference between X and Y is overwhelmingly the result of a difference between e and z. Because of this, *our conclusion is that the impact of career magnets is on students who, if they were not selected randomly, would not have gotten into any career magnet school.*